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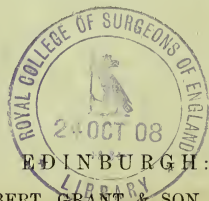
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THE CRANIOLOGY, RACIAL AFFINITIES, AND DESCENT
OF THE ABORIGINES OF TASMANIA.

BY

PRINCIPAL SIR WILLIAM TURNER, K.C.B., D.C.L., F.R.S.

[WITH THREE PLATES.]



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XVII.—The Craniology, Racial Affinities, and Descent of the Aborigines of Tasmania.

By Principal Sir Wm. Turner, K.C.B., D.C.L., F.R.S. (With Three Plates.)

(Read July 6, 1908. Issued separately October 16, 1908.)

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INTRODUCTION.

The Anatomical Museum of the University of Edinburgh contains a valuable collection of the skulls of the aborigines of Tasmania, which has not as yet been described. As the skulls of this now extinct people are limited in number in museums, and as the opportunity of collecting additional specimens no longer exists, I have thought that an account of their characters, a detailed statement of their measurements on lines similar to those pursued in my previous craniological memoirs, and a comparison of their conformation with that of the Tasmanian skulls in other collections, as described by previous writers, would be of interest to anthropologists, and might assist in the preparation of a summary of their most constant features. Consideration of the affinities and possible descent of the Tasmanians may also be appropriately included in the Memoir.

The collection began to be formed about the end of the first quarter of the last century. The first specimen in course of time—an adult male—was acquired by Professor ALEXANDER MONRO *tertius* (xxx. 1). He referred to it as a skull from Van Diemen's Land in his *Elements of the Anatomy of the Human Body*,* in a chapter entitled, "On the distinctions in the skull of the male and female, and of the distinctions of the skulls of different nations."

During the tenure of office of his successor, Professor JOHN GOODSIR, additional Tasmanian skulls were acquired for the Anatomical Museum. One of these, an adult male, is marked Van Diemen's Land, but with no other history (xxx. 5). Another, an aged edentulous male (xxx. 4), was presented by C. GRAY, Esq. The skull-cap had been previously sawn off for the removal of the brain. The outer table of the parietal bones, at and near the middle of the sagittal suture, showed a large eroded patch, and

* Second edition, p. 196, Edinburgh, 1831. MONRO *tertius* died in 1859. I became acquainted with him in 1854, about which time he was having photographs made of the most interesting skulls in his collection. I possess a photograph of the skull, No. 52, referred to in the text, marked Van Diemen's Land in Monro's handwriting. Three measurements of the skull are given in Table ii., p. 204, of his *Elements of Anatomy*, but they are incorrectly stated.

on other parts of the parietal and frontal bones numerous shallow indentations were present which somewhat modified the contour and the general appearance of the cranium. They were possibly due to pathological conditions, or may have been produced by blows of the Tasmanian weapon named the waddy.* An adult male skull (xxx. 6) was presented as from Tasmania, to the late Professor GOODSIR, shortly before his death in 1867. The bones were discoloured, as if the skull had been buried, and the outer table at the vertex and on the right parietal was abraded and the diploe was partially exposed.

During my incumbency of the Chair of Anatomy, other specimens were obtained. In 1870 an imperfect skull (xxx. 8), consisting of the frontal, both parietals, the supra-inial part of the occipital, the left temporal, and the right malar, was given by Mr J. GRANT; it was marked "extinct race V.D.L.," and from its appearance had probably been buried. Another imperfect specimen, marked "skull of an aborigine found at Bridgewater, presented by Mr BRENT" (xxx. 9), consisted of the frontal and right parietal bones, obviously those of a young person. In October 1888 one of my pupils, Dr LLOYD H. OLDMEADOW, presented to me the skull of an adult aboriginal male (xxx. 2) which he had brought from Hobart. It had been given to him by Dr E. M. CROWTHER of that town, and had been in the collection which had belonged to his father, Mr W. L. CROWTHER; it was believed to be the skull of one of the last of the aborigines, and indeed possibly that of William Lannè, the last male to survive. In February 1889 an adult skull marked Tasmanian was given to me by Mr J. C. ROBERTSON. It had previously been in the possession of Mr SEAL, a member of one of the earliest families to settle in Tasmania, and was regarded by him as that of an aborigine; it has female characters, and is marked xxx. 3 in Table I.†

The collection in the Phrenological Museum of the Henderson Trustees, now lodged in the Anatomical Museum of the University, contains an adult male skull which is marked Van Diemen's Land. It is numbered 231 in the manuscript catalogue of that collection, compiled in 1858, though it had undoubtedly been in the collection some years before that date. Its number in the catalogue of the Anatomical Museum is xxx. 7.

About the time when MONRO *tertius* obtained the skull from Van Diemen's Land already referred to, Professor ROBERT JAMESON had in his Museum of Natural History the skull of an aborigine marked Van Diemen's Land, which was also examined by MONRO, who gave some measurements in Table ii., p. 204, in his chapter on the distinctive features of the skulls of different nations. The contents of JAMESON'S great museum were transferred to a department of the State in 1854, and they are now lodged in the Royal Scottish Museum, Edinburgh. The characters of the skull are embodied in the following description.

* The waddy, about 2 feet long, was made of hard, heavy wood, sometimes knobbed at one end, which could be used as a club, or could be thrown with a rotary motion either in battle or in the pursuit of prey. BARNARD DAVIS, in his *Thesaurus Craniorum* and Supplement, refers to four Tasmanian skulls in his collection which showed marks of injury on the vault, the character of which is not specified, but may have been due to blows from the waddy.

† The Tasmanian crania are Group xxx. in the Catalogue of the collection of Crania in the Anatomical Museum of the University. The specimens in each group have consecutive numbers.

TABLE I.

Tasmanian Crania in Edinburgh Museums.

GROUP XXX.

[illegible]

DESCRIPTION OF TASMANIAN SKULLS. (Plates I.-III.)

Measurements of the skulls are given in Table I., in which they are discriminated by the catalogue numbers, Group xxx. No. 1, *e.s.* With two exceptions they were adult males, though two were advanced in years. xxx. 3 was probably that of a woman, and the fragmentary calvaria xxx. 9 was that of a youth. The lower jaw was present in only two specimens, in one of which, the aged xxx. 4, it was edentulous. No definite statement can be made of the parts of the island in which the majority of the skulls were procured, but two (xxx. 2, 9) were obtained in or near Hobart Town.

Norma verticalis.—The skulls were elongated, and dolichocephalic in the proportions of length and breadth. In three specimens the outline of the cranium was ovoid, but in the others the parietal eminences were so prominent, more especially in xxx. 2, 7, that they broke the uniformity of the sides of the cranium, the outline of which approximated to the pentagonal form. Behind the eminences the width of the cranium rapidly diminished into the occipital region.

The frontal eminences were distinct. The frontal bone in the males showed in front of the bregma an area almost triangular in form, the broad base of which was at the coronal suture, whilst the apex approached a point between the frontal eminences; its surface was convex from side to side and from base to apex. It was bounded laterally by a shallow, concave depression which extended backwards across the suture on to the parietal bone, as far as or somewhat beyond the parietal eminence. This depression was only feebly indicated in the single female skull in the collection. The temporal curved line was well marked in the male crania, and its anterior end formed the outer and lower boundary of the depression on the frontal bone. In two specimens the temporal line arched in the parietal region immediately above the eminences, and partially divided the depression on the vault into an upper and a lower area, the upper of which was the larger; but in the other skulls it intersected the eminence at or near the greatest projection and formed the lower boundary of the depression. The width of the cranium in the frontal region, as compared with the parietal or parieto-squamous diameter, was relatively small. The mean stephanic diameter was 103.2 mm.; the mean parieto-squamous diameter was 133 mm.; as the zygomatic arches were visible in the *norma verticalis*, the skulls were phænozygous.

The crania along the line of the sagittal suture were keeled, especially in its anterior half, though in some specimens in almost its whole length. In three skulls from 3 to 4 mm. behind the bregma the sagittal suture was depressed in a groove which was bounded on each side by a ridge which formed the upper boundary of the parietal depression; the groove widened as it passed backwards to the lambdoid suture. In the other skulls the groove, with its lateral bounding ridges, was either absent, or so faintly marked as to be scarcely perceptible, and the upper boundary of the parietal depression was formed by the sagittal keel itself. The keel, conjoined with the steep, lateral slope of the parietal bones down to the eminences, gave a definite, roof-shaped character to the

skulls, which, together with the shallow antero-posterior depressions in the fronto-parietal regions and the prominent parietal eminences, formed some of the distinctive features in the Tasmanian crania.

In order to give a pictorial illustration of these characters, I placed three of the skulls so as to obtain photographs of the frontal and the anterior part of the parietal regions as seen from above, and I have had "process" reproductions prepared. (Plate I., figs. 2-4).*

The median frontal convexity, the shallow depression which bounded it on each side, extending backwards into the parietal region, the projecting parietal eminences, the relative narrowness of the frontal region with the phænozygous condition of the zygomata, are reproduced in the plate. I have also obtained tracings with Lissauer's apparatus of the vertical transverse arc of the cranial vault, to show the undulating outline in the

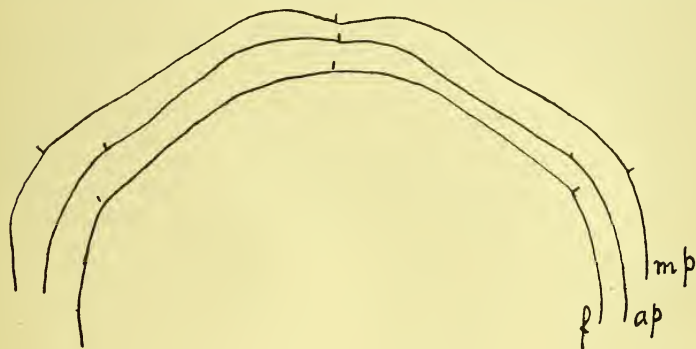


FIG. 1.

frontal region, in the antero-parietal region, and in the plane of the two parietal eminences.† (Fig 1, text.)

Below the parietal eminences the side walls of the cranium were only slightly bulging, though, as a rule, the greatest breadth was at or near the squamous suture. The parietal foramina were usually obliterated, and when present were very small. Between the obelion and the lambdoid suture the vault sloped gently downwards and backwards, and this part of the post-parietal region had a surface obliquely flattened from side to side, in no way to be mistaken for the vertical parieto-occipital flattening produced by pressure applied artificially during infancy. The general form of the skull corresponded with the *pentagonoides planum* of Sergi.

* These skulls are lettered in Table I., xxx., Nos. 2, 5, and 10.

† The frontal transverse arc *f* was taken 35 mm. in front of the bregma, the antero-parietal arc (*ap*) was one cm. behind the bregma, whilst the mid-parietal arc (*mp*) was about the middle of the eminences. The tracings were of the skull from the collection of the late Professor ROBERT JAMESON (Table I. No. 10). Professor CUNNINGHAM kindly traced them of the size of Nature with a Lissauer's apparatus in his possession. The short vertical lines on the vertex are in the position of the sagittal suture; those at the sides mark the temporal curved lines.

The suprainial part of the occipital squama formed a large rounded protuberance in the female skull (xxx. 3), a character which may perhaps be regarded as sexual rather than racial, and the vertical diameter following the curve from lambda to inion was 70 mm. In the male (No. 2) the protuberance was moderate, and its curve was 64 mm. In Nos. 4, 7, and the Jameson skull it was feeble; the length of the curve in No. 4, owing to the skull-cap being loose, could not be exactly stated, but in No. 7 it was 70 mm. and in the Jameson specimen 52 mm. In the Monro specimen No. 1 and in No. 5 the suprainial region was almost a plane surface; in No. 5 the inion practically formed the posterior pole of the cranium; in No. 1 the lambda-inial diameter was 60 mm.; in No. 5 only 43 mm. The feeble occipital protuberance in three males, and the flattened occipital squama in two others, proved that the occipital lobes of the cerebrum in these skulls could not have projected much beyond the posterior border of the cerebellum. The transverse curve of the occipital bone, immediately above the inion and between the asterionic angles, was 123 mm. in the Monro specimen No. 1, 126 in 3, 128 in 4, 133 in 6, 139 in the Jameson specimen, and 150, 153, and 155 mm. in Nos. 5, 2, and 7 respectively.

Norma lateralis.—The forehead receded somewhat in the male skulls, especially in No. 1, but it approached more to the vertical in the female No. 3. The glabella and supraciliary ridges were strong in the males, especially in the Monro specimen; in No. 6 each ridge was directly continued into the thick upper orbital border as a *torus supraorbitalis*, but in the others it was separated from it by the supraorbital notch or foramen. The frontal, between the outer end of the ridge and the temporal curved line, formed a *supraorbital trigone* and sloped obliquely backwards to the external orbital process. The frontal was not grooved for the passage of the supraorbital vessels or nerve above their foramen of exit. The nasion was deeply depressed. The nasal bones were entire in four skulls, and in them the bridge measured mesially, in a straight line, 13, 15, 17, and 17 mm. respectively; the bones were short and narrow, whilst deeply seated below the prominent glabella the bridge, though concave in profile and continuous with the very depressed nasion, had a shallow keel mesially. In each cranium the occipital longitudinal arc was the shortest, in seven the parietal was the longest, though as between the frontal and parietal the difference in six skulls was only from 1 to 4 mm. The crania rested behind on the mastoids in three specimens, but in the others either on the cerebellar fossæ or the occipital condyles. (Plates II., III.; figs. 6, 8, 10, 12.)

Norma facialis.—The floor of the nose was not separated from the incisive region by a sharp ridge, and the nasal floor was often continued smoothly into the incisive area. The maxillo-nasal spine was feeble, and usually continued into the nasal septum. The nasal height in the seven males ranged from 44 to 54 mm. and the mean was only 47·6. The width of the anterior nares in each specimen was more than half the height of the nose, and in some cases much wider. No nasal index was narrow or leptorhine, only one was mesorhine, the rest were platyrhine, and in four the index was above 60, the highest being 65·9; the mean of the series was 59·9. In the female skull the lower jaw was

complete and the nasio-mental length was 96 mm., but as the zygomatic arches were broken, the complete facial index could not be computed. In five skulls the maxillo-facial index ranged from 40·5 to 53·3; three were leptoprosopic, narrow faced, and in them the maxillary region was relatively narrow, as if pinched in laterally; one skull was chamæprosopic (40·5), low-faced, but the mean of the series (49) was mesoprosopic. In four skulls, not including the edentulous, the upper jaw, on inspection, showed none or but little alveolar prognathism, but in three the prognathism was distinct. The gnathic index obtained by Flower's method ranged from 97 to 105·2; two were in the orthognathic group, three were mesognathic, two were prognathic; the mean of seven skulls was 100·6, *i.e.* mesognathous. The canine fossæ were distinct, and in two they had unusual depth. The incisive fossæ were shallow in the orthognathic skulls, but were more marked in the prognathic. (Plates II., III.; figs. 7, 11.)

The nasio-malar index* ranged from 103·8 to 109; two skulls were platyopic, six mesopic, none pro-opic *i.e.* with a projecting profile; the presence of a slight keel in the bridge of the nose contributed to place the mean 106·7 in the mesopic group. The orbital aperture was transversely elongated and relatively low, the vertical diameter of the os planum was also low, and its anterior border had only a short articulation with the lachrymal. The supraciliary ridge and the upper border of the orbit projected in front of the plane of the lower border of the orbit. The outer border of the orbit was considerably behind the inner border, and the plane of the orbital aperture was oblique. The infraorbital suture was usually obliterated. The orbital index ranged from 68·2 to 84·6; no specimen was megaseme, two were mesoseme, six were microseme, and the mean index 78·2 was microseme. The interorbital width in six skulls ranged from 20 to 25 mm.; in two it was 27, in one 28 mm. The malar bones were small.

The hard palate in some skulls was shallow, in others it was moderate in height, but no specimen had a high vault. The palato-maxillary index ranged from 108·3 to 116·9, and the mean of five specimens was 113·4; one was dolichuranic, with a relatively long palate; two, brachyuranic, were more evenly proportioned in length and breadth; two, mesuranic,† had intermediate proportions. The lower jaw in the male (xxx. 4) was edentulous, and the senile characters were pronounced. In the female the mandible, though of moderate size, was well formed and with the muscular markings feeble; the chin was also feeble. The teeth were mostly lost from the maxillæ; when present they were, as a rule, worn by use, but were not stained; the alveoli were unabsorbed and the adult dentition had been completed. In the left upper dentary arcade of xxx. 2 the socket of a fourth molar was present, but the tooth had dropped out. The sockets for the incisors were not absorbed, and obviously the extraction of upper incisors at puberty had not been practised by these Tasmanians. One or more molars and pre-

* The nasio-malar index is computed by dividing the nasio-malar line $\times 100$ by the bi-malar line; the index of a pro-opic or projecting profile is above 110, a platyopic or flat profile is below 106, while a mesopic profile has the index between 106 and 110.

† See "On the Craniology of the People of Scotland," *Trans. Roy. Soc.*, vol. xl. p. 6071, 1903, for explanation of these terms.

molars were preserved in each of seven skulls. In one the crown of the 1st molar was 12 mm. in antero-posterior and 12 mm. in lateral diameter, and the tooth may be regarded as megadont; in two others 10 by 11 mm. The crown of the 2nd molar was in one skull 10 by 12 mm., in another 10 by 11 mm. The wisdoms were usually lost, but the crown of one was 10 by 12 mm. in diameter. The crowns of the 1st and 2nd premolars in one skull were 6 by 9 mm. The teeth had been regularly arranged in their respective arcades, and the empty sockets were commodious.

The cranial sutures were usually simple, and the sagittal was the most strongly denticulated. In Nos. 1, 3 and 4, they were in course of senile obliteration; no skull was metopic.* No. 5 had a large epipteric bone on each side, and No. 2 had a small one in the right pterion. The Jameson skull had no sutural bones, but a strong process passed from the left squamous to the frontal and intervened between the parietal and alisphenoid. Five skulls had small Wormians in the lambdoid, and No. 1 had minute sutural bones in the left coronal.

The mastoids and inion were not massive, but the superior curved occipital line was sometimes strong and divided into an upper and a lower part separated by an intermediate area; No. 7 had two pea-like exostoses on the left parietal. No skull had a third condyl. In No. 1 the right external pterygoid was fused with the spine of the sphenoid and was pierced by two pterygo-spinous foramina; on the left side one foramen had its boundary incomplete. In No. 2 a similar fusion was present on the left side, pierced by two foramina. In some skulls the jugal processes were tuberculated.

The crania ranged, in maximum length, from 175 to 191 mm., and the mean length of nine was 182.8 mm. The parieto-squamous breadth ranged from 127 to 141 mm., and the mean was 138 mm.; the cephalic index ranged from 69.1 to 74.7, and the mean was 72.7; all the skulls were dolichocephalic. The basi-bregmatic height ranged from 125 to 135 mm., and the mean of eight skulls was 131.1; the vertical index ranged from 69.4 to 74, and the mean was 72.1, metriocephalic. In three skulls the height somewhat exceeded the breadth, but in five the breadth was greater than the height; the mean of the group was 138 mm. in breadth to 131 mm. in height. The cranio-facial index † was computed in six skulls, and ranged from 68.5 to 75.6; the mean of the series was 72.1, which differed only fractionally from the mean of the dolichocephalic index.

The cubic capacity was determined in eight skulls by the use of shot, in accordance with the method ‡ which I have employed for about twenty-five years in the study of the capacity of about six hundred crania of various races. The female skull measured 1260 c.c.; the seven males ranged from 1100 to 1430 c.c., and the mean capacity in this sex was 1235 c.c. The Jameson skull, which had the least internal capacity (1100 c.c.),

* FLOWER has shown that the skull of an old Tasmanian woman in the Museum of the Royal College of Surgeons is metopic, also the male skull in the Natural History Museum, South Kensington.

† The cranio-facial index is computed by the formula $\frac{\text{interzygomatic breadth} \times 100}{\text{maximum length}}$, the length = 100. See my Memoir on the natives of Borneo, etc., *Trans. Roy. Soc. Edin.*, part iii., p. 800, vol. xlv., 1907.

‡ Described in "*Challenger*" Reports, "Zoology," part xxix., 1884.

was the smallest in the external dimensions of length, height, and circumference; whilst No. 7, which had the greatest internal capacity (1430 c.c.), had large external dimensions in length, height, breadth, and circumference.

COMPARISON WITH TASMANIAN SKULLS IN OTHER COLLECTIONS.

As collections of Tasmanian skulls in several museums have been described by eminent anthropologists, I purpose to compare my specimens with those previously recorded. By way of preface, I shall state where these skulls are to be found.

OWEN, in his descriptive catalogue of the osteological series in the Museum of the Royal College of Surgeons of England,* gave brief notes of nine Tasmanian crania at that time in the museum. In FLOWER's catalogue of the same museum measurements, in some cases short descriptions, are given of the specimens, which are now twenty in number,† two of which are associated with skeletons. Of these seventeen are adults, nine males, seven females, but the sex of one is not stated; whilst two others are youths and one is an infant. This museum also now contains the splendid collection formed by BARNARD DAVIS, catalogued independently:‡ fifteen are Tasmanians, nine males, to one of which a skeleton belongs, and six are females. The characters of the skulls, both in the Davis and the Surgeons' collection, have also been generally described by J. G. GARSON in a chapter in LING ROTH's treatise on the aborigines of Tasmania. The British Museum of Natural History at South Kensington possesses an adult male skeleton which formerly belonged to the Anthropological Institute. In the collection of crania in the Museum of the Army Medical Department, formerly at Fort Pitt, Chatham, afterwards at Netley, but now at Millbank, four skulls were catalogued by Dr G. WILLIAMSON as natives of Van Diemen's Land. Of these, only two, an adult male and a youth, can be regarded as Tasmanian.§

In 1872 M. TOPINARD published a critical study of the Tasmanian skulls in the museums in Paris, which contain nine specimens, five adult males, three females, and a youth of eleven years, and MM. DE QUATREFAGES and HAMY have made the same crania the basis of an elaborate chapter in their great work *Crania Ethnica*. In 1862 BARKOW figured the vertex and occipital surface of an adult Tasmanian skull in the museum at Breslau,|| and additional details of its form, dimensions, and character have been subsequently given by WIEGER in his catalogue¶ of the Anthropological Collection in that museum.

* London, 1853.

† 1st edition, p. 198, 1879; 2nd edition, edited by C. STEWART, p. 337, 1907.

‡ *Thesaurus Craniorum*, p. 267, 1867, and Supplement, p. 63, 1875.

§ *Dublin Quarterly Journal of Medical Science*, vol. xxiv., 1857. The skulls are numbered in WILLIAMSON's catalogue Nos. 445, 446, 58, 59. On visiting the museum at Millbank a short time ago, Colonel WARDROP, the Commandant, kindly gave me permission to see the collection. Nos. 445, 446, have strong Tasmanian characters, and in 446 the wisdoms had not erupted and the basi-cranial synchondrosis was not ossified. No. 58 has apparently been lost. No. 59 is evidently, as Dr WILLIAMSON stated, not distinctively Tasmanian.

|| *Comparative Morphologie*, Breslau, 1862, Plates x., xi.

¶ *Katalog*, Museum, Breslau, 1884.

In the Collection of crania in the Oxford University Museum are six adult skulls which have been regarded as Tasmanian. Measurements by Dr GABRIEL FARMER of this series were included in LING ROTH's comprehensive treatise, and he abstracted the following notes from the museum catalogue:—Nos. 1 and 2 were received in 1864; No. 3 was given by the Rev. W. W. SPICER; Nos. 5 and 6 were obtained in 1887; whilst No. 4, said to have been brought by Captain Cook and to be Polynesian, was stated in Dr RIDD's catalogue to be Tasmanian. As the skulls, according to FARMER's table of measurements, ranged in the cephalic index from 70·5 (No. 1) to 82 (No. 4), I asked my friend Professor ARTHUR THOMSON to ascertain if any further information regarding their possible origin could be obtained, for the range given to the cephalic index gave one the impression that skulls other than Tasmanians might have been included in the series; but his reply was that nothing could be added to the notes abstracted by FARMER from the catalogue. Professor THOMSON very courteously undertook to have the skulls re-measured by two of his pupils, Mr F. H. S. KNOWLES and Miss BARBARA W. FREIRE-MARRECO, who have checked each other's measurements and rechecked them with the figures given in FARMER's table. As their results differ in many respects from those given by FARMER, I have the consent of Professor THOMSON to reproduce them in Table II. of this memoir.

In the Museum at Hobart Town, Tasmania, are nineteen crania, which at one time were believed to be those of aborigines. They have now been carefully studied by Messrs HARPER and CLARKE,* with the result that only twelve specimens, six males and six females, one of which was much broken, were retained as genuine Tasmanians. Of the remainder, three were probably half-castes, and three were incorrectly classed. W. H. L. DUCKWORTH has described an adult male skull, the facial part of another male, a calvaria, and two lower jaws in the Anatomical Museum of the University of Cambridge;† the calvaria and one of the mandibles were presented by Mr JAMES BONWICK, the well-known writer on Tasmania. In the catalogue of the crania in the Museum in Philadelphia, J. AITKEN MEIGS marked with a query, No. 1343, as "Tasmanian of Van Diemen's Land," but without description or measurements. H. KLAATSCH has given, with figures, a series of comparative measurements of eight of the Tasmanian skulls in the museums in London and Paris.‡ He also stated that Professor v. LUSCHAN, in his private collection in Berlin, has five Tasmanian skulls purchased from the widow of Mr G. A. ROBINSON, who acted as Protector of the aborigines. I am not acquainted with any description of these specimens, nor have I any information of a Tasmanian skull said by BARNARD DAVIS to be in a museum in Vienna.

The crania catalogued in museums as Tasmanian, including those recorded in this memoir, which have been studied and described by anthropologists, and the measurements of which have been more or less fully recorded, are seventy-nine in number.

* *Papers and Proc. Roy. Soc. Tasmania*, for 1897, p. 97, 1898.

† *Journ. Anth. Inst.*, vol. xxxii., 1902; and *Cambridge Studies*.

‡ *Zeitsch. für Ethnologie*, Heft 6, 1903.

Of these, seventy-three are adults and six are young. Forty-two adults are regarded as males, twenty-six as females, whilst the sex of five is either doubtful or not specified.

TABLE II.

Tasmanian Crania, Oxford University Museum.

| | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 |
|--|-------|-------|-------|-------|-------|-------|
| Collection number | 1017 | 1019 | 1020 | 1021 | 1021A | 1021B |
| Age, | Adol. | Ad. | Aged. | Ad. | Ad. | Ad. |
| Sex, | F. | F. | F.? | M.? | M. | F. |
| Cubic capacity, | 1200 | 1160 | 1120 | 1220 | 1180 | 1060 |
| Glabello-occipital length, | 185.5 | 174. | 181. | 181. | 174.5 | 166 |
| Basi-bregmatic height, | 125 | 133 | 122 | 128 | 128 | 126 |
| Vertical Index, | 67.4 | 76.4 | 67.4 | 70.7 | 73.3 | 75.9 |
| Minimum frontal diameter, | 96 | 96 | 91 | 95 | 98 | 87 |
| Stephanic diameter, | 100 | 111 | 104 | 110 | 113 | 106 |
| Asterionic diameter, | 104 | 105 | 98 | 104 | 99 | 100 |
| Greatest parieto-squamous breadth, | 132 | 127 | 129 | 142 | 135 | 131 |
| Cephalic Index, | 71.1 | 73 | 71.2 | 78.4 | 77.3 | 78.9 |
| Horizontal circumference, | 503 | 485 | 493 | 503 | 488 | 469 |
| Frontal longitudinal arc, | 129 | 125 | 123 | 129 | 120 | 112 |
| Parietal " " | 125 | 118 | 114 | 127 | 119 | 112 |
| Occipital " " | 112 | 105 | 115 | 107 | 111 | 106 |
| Total " " | 366 | 348 | 352 | 363 | 350 | 330 |
| Vertical transverse arc, | 290 | 292 | 280 | 308 | 300 | 287 |
| Length of foramen magnum, | 40 | 37 | 34 | 32.5 | 30 | 32 |
| Basi-nasal length, | 94 | 98 | 92 | 98 | 98 | 95 |
| Basi-alveolar length, | 95.1 | 105 | 91.1 | 97.1 | 100 | 94 |
| Gnathic Index, | 101.1 | 107.1 | 98.9 | 98.9 | 102. | 98.9 |
| Interzygomatic breadth, | 123 | 129 | ... | 128 | ... | ... |
| Intermalar " " | 107 | 117 | 117 | 112 | 112 | 105 |
| Nasio-alveolar length, | 58.1 | 58 | 56.1 | 57.1 | 57 | 61 |
| Mazillo-facial Index, | 47.1 | 44.9 | ... | 44.5 | ... | ... |
| Nasal height, | 43 | 42 | 44 | 46 | 44 | 47 |
| Nasal width, | 28 | 29 | 27 | 26.5 | 26 | 27 |
| Nasal Index, | 65.1 | 69. | 61.4 | 67.6 | 69. | 67.4 |
| Orbital width, | 40 | 43 | 37 | 38 | 40 | 40 |
| Orbital height, | 33 | 30 | 29.5 | 31 | 30 | 30.5 |
| Orbital Index, | 82.5 | 69.8 | 78.4 | 81.6 | 75. | 75. |
| Palato-maxillary length, | 55 | 59 | 50 | 56 | 55 | 52 |
| Palato-maxillary breadth, | 62 | 65 | 64 | 65 | 63 | 61 |
| Palato-maxillary Index, | 112.7 | 110.1 | 128. | 116. | 114.5 | 117.3 |
| Length of molars and pre-molars, | 50 | 40 | 44.1 | 43 | 42 | 41.1 |
| Dental Index, | 53.1 | 40.8 | 47.8 | 43.8 | 42.8 | 43.1 |

[From the measurements of KNOWLES and FREIRE-MARRECO, recorded in Table II., three of the Oxford skulls are below 75, i.e. are dolichocephalic; one at 77.3 is in the lower term (below 77.5) of the mesaticephali, and two are in the upper term of that group; the mean cephalic index of the series is 75. With the exception of No. 2, the height is less than the breadth, and the mean vertical index is 71.8. In the projection of the jaw taken by FLOWER'S method, no skull was orthognathous, one was prognathous, the others were mesognathous, and the mean of the series, 101.1, was mesognathous. All the skulls showed a wide platyrrhine nose, and the mean nasal index was 61.6;

the mean nasal height was only 44·3 mm. In the dimensions of the orbit the height was small in proportion to the width, and the orbit was low or microseme. The mean palato-maxillary index was 116·6, *i.e.* horseshoe-shaped or brachyuranic.

The three skulls in which the cephalic index was mesaticephalic were shorter in the parieto-occipital region than those with dolichocephalic proportions, and corresponded with the form named by SERGIE *pentagonoides planum*. In each skull the anterior end of the sagittal suture was on the summit of the roof-shaped vault, but further back the suture sank into a mesial depression, bounded on each side by a lateral ridge on the parietal bone. The parietal eminences were distinct, and in some skulls very prominent. A shallow antero-posterior depression was on the parietal between the lateral ridge and the parietal eminence, but in three skulls the depression was not marked in the frontal region.]

Cranium.—The characters of the Tasmanian crania in various collections have been described, in some cases with much detail, by G. WILLIAMSON, BARNARD DAVIS, FLOWER, GARSON, TOPINARD, DE QUATREFAGES and HAMY, WIEGER, HARPER and CLARKE, DUCKWORTH, KLAATSCH and myself, and several of the skulls have been figured. The crania in the museums in Paris have formed the subject of elaborate descriptions by M. TOPINARD, and MM. DE QUATREFAGES and HAMY, who have pointed out their most salient features. The vault, as a rule, was roof-shaped, the sagittal line was keeled, and the vault sloped steeply down to the parietal eminences, which were well-defined, prominent, and at times approximated to a conical form. Raised lines were said to extend from before backwards in the area between the sagittal suture and the parietal eminences, whilst grooves (*gouttières*) extended in the same direction above the parietal eminences to end about the middle of the parietal bones. The frontal eminences were distinct. The supracliliary ridges and glabella were strong and overhung the orbit. The sagittal suture was depressed in a groove in the mesial keel; the vault behind the obelion formed an almost plane surface as it sloped down to the lambda. The occipital pole had not, as a rule, much projection; the inion was feeble, and the suprainial area, in its relation to the cerebrum, was small in proportion to the size of the nuchal or cerebellar part. Some, if not all, of these characters were recognised by BARNARD DAVIS, FLOWER, and GARSON, in the skulls in the important collection in the Museum of the Royal College of Surgeons, and by HARPER and CLARKE in those in the Hobart Museum. In my account of the skulls in the Edinburgh museums, I have emphasised these characters as diagnostic of the vault of Tasmanian crania, and I have expressed their importance in the description and by the figure (page 369) and in the Plates I., II.

The measurements published by myself and the authorities referred to enable one to state the range in the dimensions of length, breadth, and height of the crania and the proportion which these diameters bear to each other. As regards length, five male skulls were said to be 190 mm., or even a little more in the longest diameter, but the greater number were between 180 and 190 mm., and several were between 170 and 180 mm. In the greatest breadth, eleven males were 140 mm. or a little more, but the majority were between 130 and 140 mm. The basi-bregmatic height gave a maximum 142 mm., but from 130 to 140 mm. was the rule; the female skulls measured

were less than 130 mm., and one has been recorded as low as 117 mm. The female Tasmanian skulls, as in other races, were less in height than the males. In their external dimensions the crania were, as a rule, moderate in size.

The length-breadth or cephalic index I have computed in sixty-nine Tasmanian skulls. The lowest recorded is 69·1, in the male skull (xxx. 6) in the University of Edinburgh; the highest 79·9, in a skull (No. 1105) in the Hunterian Collection in the Royal College of Surgeons of England. The mean index in sixteen adults in the latter museum is 76·1, for FLOWER, differing from anthropologists generally, measured the length from the ophryon to the occipital point, and excluded the glabella, so prominent in Tasmanian crania; had this been included, the individual as well as the mean index would not have been so high, and more in accordance with my own and other measurements. The mean index of the sixty-nine skulls was 74·7, and of these thirty-eight were 75 or less (dolichocephalic), nineteen were between 75·1 and 77·5, *i.e.* in the lower term of the mesaticephali, approximating therefore to the dolichocephali; twelve were in the higher term of the mesaticephali, and no specimen was brachycephalic, *i.e.* numerically, 80 or upwards. As about five-sixths of the crania were numerically dolichocephalic or closely approximated thereto, one is justified in regarding this as the group with which the Tasmanian aborigines may be associated. With regard to the minority in the higher term of the mesaticephalic group, seeing that the specimens in museums had been presented by various collectors, many of whom had had no special training in discriminating characters, it is not unlikely that some skulls have been regarded as those of Tasmanian aborigines which may have been half-castes, especially if obtained after the English occupation of the island. It is also possible that two or three skulls of Polynesian islanders may have got accidentally mixed with the Tasmanians and have been wrongly labelled.

In previous memoirs I have considered the relation of length to height in several hundred crania of different races, and I have now computed the length-height or vertical index, not only in eight of the Tasmanian skulls described in this memoir, but in fifty-seven skulls measured by the craniologists in charge of other collections. Of the sixty-five adults, thirty-nine were presumably male and twenty-six female. The vertical index ranged from 66·2 to 80, and the mean was 71·1. In twelve specimens the index was below 70 and may be termed low or chamæcephalic; in forty-two it was from 70 to 75, metricephalic (orthocephalic); in only six did the index exceed 75, so as to give a high or hypsicephalic character to the cranial vault. The skulls, therefore, in the majority of specimens, were moderately high in relation to the length, as is shown in the mean index, 71·1, computed for the whole series.

In sixty-five skulls the breadth exceeded the height in forty-eight specimens; the breadth was less than the height in twelve, and the breadth and height were equal in five. I have elsewhere * called attention to the fact that in such well-pronounced

* See references in my memoir on the Craniology of the People of Scotland, *Trans. Roy. Soc. Edin.*, vol. xl, part iii. p. 599, 1903.

dolichocephalic races as the Melanesians, the Australians, and the Dravidians, the height of the cranium was, as a rule, greater than the breadth, and the skulls were relatively high and narrow, hypsistenocephalic, in the sense in which the term was employed by BARNARD DAVIS. On the other hand, in characteristic brachycephalic races as the Burmese, Andaman Islanders, and brown Polynesians, the height was usually less than the breadth and the skulls were broad and low. The relations of breadth to height may be expressed by a *breadth-height index* computed by the following formula, the breadth being regarded as = 100 :

$$\frac{\text{basi-bregmatic height} \times 100}{\text{parieto-squamous breadth}}.$$

In eight of the adult skulls in the Edinburgh museums the mean breadth was 132 mm. ; the breadth was more than the height in five, but less than the height in three ; the mean height was 131 mm., which gave a mean breadth-height index 99·3. When the corresponding dimensions of the Tasmanian skulls measured by other observers were computed along with those which I have now recorded, the mean breadth worked out at 133·8 and the mean height at 128·2, which gave for the series a mean index 95·8. The mean breadth-height index, therefore, in these crania was less than 100, and the skulls belonged to the group which I have elsewhere named *platychamæcephalic*, i.e. broad and low crania.* In this respect, notwithstanding the relation of length to breadth being of the dolichocephalic type, that of breadth to height corresponded with the proportion existing in many brachycephalic races. We may conclude that in Tasmanian crania it is the rule for the breadth to exceed the height, a character which is without doubt due to the prominence of the parietal eminences.

The internal capacity of my seven adult male crania ranged from 1100 to 1430 c.c., with the mean 1235 c.c. In the males in the Paris museums DE QUATREFAGES and HAMY gave approximately 1465 c.c.† for two, and 1375 c.c. for three specimens. In FLOWER'S series the range of nine males was from 1100 to 1400 c.c., with the mean 1243 ; in HARPER and CLARKE'S three males the range was from 1155 to 1450 c.c., with the mean 1282 ; in the Oxford collection two males were respectively 1180 and 1220 c.c. ; WIEGER stated that the skull in the Breslau Museum measured 1225 c.c., and DUCKWORTH gave the capacity of the male skull (No. 2096) in the Cambridge Museum as 1130 c.c. The general result of these measurements shows that the average capacity of the male Tasmanian skull is from 1200 to 1300 c.c., though a few individuals may have an exceptional capacity of more than 1400 c.c., and the mean of the three largest was as much as 1448 c.c., which approaches the mean capacity in European men. BARNARD DAVIS determined the capacity of the skulls in his collection by filling them with sand, which he then weighed and expressed the amount in ounces avoirdupois and in grammes. In his memoir on the determination of the weight of the brain,‡ he has

* Memoir on Scottish Crania, *op. cit.*

† These authors employed the method of Broca to obtain the internal capacity, a method which it is now admitted overestimates the amount of the cranial contents.

‡ *Phil. Trans. Roy. Soc.*, London, 1868.

given the mean internal capacity also in cubic inches. He stated the mean of eleven Tasmanian skulls, seven males and four females, to be 1197 grammes, equal to 82·8 cubic inches; as the mean capacity in the males is put at 1230 grammes, the equivalent would be 1392 c.c., which is materially higher than the average amount obtained by myself and the other observers above referred to. The higher average is probably due to the fact that the sand which filled the male skull (No. 1761) is said to have weighed 83 oz. avoird., equalling 2355 grammes, which, when expressed in cubic centimetres, gives an abnormal capacity.

In the Tasmanians, as in other races, the mean capacity of the female crania is distinctly below that of the males. I had only one female skull, which measured 1260 c.c.; DE QUATREFAGES and HAMY found three skulls in the Paris museums to have a mean capacity 1170 c.c. In FLOWER's series the range in seven crania was from 1075 to 1350 c.c., with the mean 1175 c.c.; in HARPER and CLARKE's series five skulls ranged from 1050 to 1135, with the mean 1089; four specimens in the Oxford collection ranged from 1060 to 1200, with the mean of 1135 c.c. BARNARD DAVIS gave in his memoir the mean capacity of four females as 1100 grammes; but in his work on the osteology of the Tasmanians he places it as 1103 c.c. In both sexes, therefore, the mean is markedly below the European standard, and the skulls as regards their capacity fall into the microcephalic group.

Face.—The configuration and proportions of the face as they have been described in the specimens under review may now be considered. The projection and mass of the glabella and supraciliary ridges and the deep depression of the nasion constituted marked characters. The nasal bones were short and narrow. The bridge of the nose was feeble and the profile outline was strongly concave. The anterior nares were wide absolutely, and also relatively to the height of the nose, which was short; the nasal index in fifty specimens measured ranged from 49·1 to 69, and the mean was 58·8, markedly platyrrhine. The nasio-alveolar diameter, which corresponded with the length of the superior maxillæ, was short, which occasioned the short, vertical diameter of the face as a whole, the short nose, as well as the low vertical diameter of the orbits; though the massive supraciliary ridges and superior orbital borders contributed also to diminish the height of these chambers. The orbital index in fifty-one specimens ranged from 66·7 to 91·9, and the mean was 77·8, which established a low orbital, or microseme index for the Tasmanian skulls.

The forward projection of the upper jaw varied in the individual specimens, and the eye could recognise some in which the orthognathic character was evident; several were prognathic, and others were intermediate in the degree of projection. When the degree of projection was estimated by the proportion between the basi-nasal and basi-alveolar diameters, the former being regarded as = 100, and an alveolar or gnathic index computed according to the method of FLOWER, the index in thirty-four specimens, recorded by different observers, ranged from 96·9 to 113·2, and the mean of the series was 103·6, prognathic, therefore in accordance with FLOWER's classification.

Objections have, however, been advanced from time to time to the plan which he pursued, and consequently to the results obtained, and his method has recently been criticised with much force by Professor ARTHUR THOMSON and Mr RANDALL-MACIVER, by whom another method of estimating prognathism has been suggested and a trigonometer devised for obtaining it.* The Tasmanian skulls in the Oxford collection have been tested by Miss FREIRE-MARRECO with the trigonometer, as well as by FLOWER's method, and a facial angle has been also obtained. The method of FLOWER resulted in no skull, apparently, being orthognathic, whilst one fell into the prognathic group and the rest were mesognathic, of which two were in the higher terms of that group. As measured by THOMSON's trigonometer, two of these skulls were prognathic, two were in the higher terms of the mesognathic group, and two were orthognathic. The facial angle in the Oxford collection ranged from 68° to 76° , and the projection in accordance with the standard of the Frankfort agreement was prognathous. The different results procured by these methods on the same skulls illustrate the difficulty of obtaining a precise estimate of the degree of prognathism.

The incisor teeth had not been artificially extracted in any of my specimens. In a male Tasmanian skeleton from Flinders Island, in the Museum of the Royal College of Surgeons, FLOWER thought that the two upper central incisors had been removed during life, and similarly that in a female skeleton the four upper incisors had been extracted. BARNARD DAVIS considered that there could be no doubt that the teeth in these skulls had been punched out, as is the practice with some Australian tribes, and as is common amongst the Sandwich Islanders, for the alveolar process was absorbed and wholly effaced. In no other collection has a similar condition been described, so that the practice of extracting the incisors during life was exceptional. LA BILLARDIÈRE, who saw in 1793 more than forty natives, stated that of the people of Adventure Bay in some the upper middle incisor and in others both upper incisors were wanting (p. 320). He seems to be the only naturalist who has recorded this condition in the living native.

Several observers had noticed the large size of the teeth in the Tasmanians. FLOWER, in his paper "On the Size of the Teeth as a Character of Race," † placed them along with the Melanesians and Australians in the *Megadont* group, and he gave the mean dental index in the Tasmanians in both sexes as 48·1, whilst that of the Australians was 45·5. He had elsewhere stated ‡ that they seemed to differ from these and other kindred races in the tardy development and irregular position of the posterior molars, which are frequently retained within the alveoli, or are set obliquely or irregularly, as if owing to their large size they could not find room in the jaw. The specimens in the Edinburgh museums do not, however, show irregularities or tardy development in the molar series.

* *The Ancient Races of the Thebaid*, Oxford, 1905.

† *Journal Anthropological Inst.*, November 1884.

‡ Evening Lecture, *Proceedings* Royal Institution of Great Britain, May 31, 1878.

In a previous memoir* I made a comparison between the upper and lower dentary arcades in Australian skulls, as regards their overlapping and the length and width of the crowns of the premolar and molar series of teeth, to which I may refer for particulars. In the group of Tasmanian skulls the conditions did not permit of a similar detailed examination and the computing of a dental index after the manner of FLOWER. In Table II., p. 375, compiled by KNOWLES and FREIRE-MARRECO from their measurements of the skulls in the Oxford University Museum, the length of the premolars and molars in the upper dentary arcade is given and a dental index has been computed, which ranges from 40·8 to 53·1, with a mean of 45·2, which almost corresponds with the mean of the Australians recorded by FLOWER. KLAATSCH's measurements also show large molars in a Tasmanian skull which he examined.

COMPARISON OF TASMANIANS WITH OTHER RACES.

Van Diemen's Land was discovered in 1642 by the Dutch seaman ABEL JANSEN TASMAN, but the name which he gave to the island is now replaced by that of Tasman himself. He observed smoke and heard the sound of people, but made no observations on the inhabitants.

The first description of the natives was written by M. CROZET, lieutenant in Marion du Fresne's ship *Mascarin*,† which anchored in Frederick Henry Bay, in the south of the island, in 1772. They were of ordinary stature, one man being 5 ft. 3 in.; the skin was black, but when washed it was said to be reddish brown, though smoke and dirt made it look dark. The hair was woolly, tied in peppercorn knots and powdered with red ochre; the mouth was full, teeth very white; the nose was flattened; the eyes were generally small and bilious-looking; the men were not circumcised, but some had cicatrices on the skin.

Five years later the great navigator JAMES COOK anchored in January 1777 in Adventure Bay, in the south of the island.‡ The men were naked, but the women wore a kangaroo skin tied over the shoulders and round the waist. The colour was black, and the skin was marked with scars. The hair of the head was woolly, though in the women it was often completely or partially shorn; it and the beard, as well as the face, were smeared with red; the lips were said to be not remarkably thick, nor the nose flat. Mr WM. ANDERSON, surgeon to Captain Cook's ship, *Resolution*, supplemented the above description: the skin, he said, was a dull black, the colour being heightened by smutting the body; the hair was perfectly woolly and divided into small parcels by grease and red ochre, though in a boy whose head had not been smeared the hair was of the same kind; the nose was not flat, but broad and full; the lower part of the face projected; the teeth were broad but not equal, and the mouth was rather wide. A drawing by

* *Journ. of Anat. and Phys.*, vol. xxv. p. 416, 1891.

† LING ROTH's translation of CROZET's *Voyage*, p. 18.

‡ *Third Voyage to the Pacific Ocean*, vol. i. p. 95, London, 1785.

WEBBER, artist to the expedition, of a man, and of a woman with the head shaved, illustrated Cook's description.

The island was visited in 1788 by Captain BLIGH, who saw a few natives, moderate in stature, and with the skin a dull black and marked with scars. In 1792, and again in 1793, Admiral d'ENTRECASTEAUX stayed some time on the coast. In 1798 the wide strait which separates Tasmania from Australia was discovered by the naval surgeon GEORGE BASS, and he and Captain FLINDERS surveyed the coasts in that and the years immediately following.* They met a man and two women at the mouth of the Derwent whose hair, either close-cropped or naturally short, did not, they said, appear to be woolly. Their skin was marked with cicatrices, and the face was blackened. Colonel COLLINS in his account of New South Wales† includes in it, extracted apparently from BASS's *Journal*, a chapter on Tasmania in which is a similar description of the natives; but in a footnote he stated that hair undoubtedly woolly had been cut from the head of a native seen by Mr RAVEN at Adventure Bay. In 1802 Captain BAUDIN spent some time on the island. In 1803 Tasmania was added to the British Empire, and in the following year a convict establishment was settled at Hobart.

D'ENTRECASTEAUX was accompanied by the naturalist LA BILLARDIÈRE, who described‡ the natives as tall and muscular, with curled hair and long beards; he also figured two men, a boy, and a woman carrying a child on her head, as well as groups pursuing their avocations. The woolly, frizzled hair and the general aspect of the features were depicted. The skin, he said, was not a very deep black, but the colour was deepened by rubbing it with charcoal, and it was marked with cicatrices.

M. PÉRON, the naturalist on Captain BAUDIN's ship, enjoyed good opportunities of observing the external characters, muscular power, habits and manners of the natives. The women greased the skin with the fat of seals and daubed it with charcoal, its natural colour was more brown than in the Australians and it was marked with scars. They were naked, though some wore a kangaroo skin on the back. The hair was short, frizzled, black, and in some reddened with ochre.§ PÉRON published an Atlas with several portraits in which the characters of the hair and features were represented; the mammæ were pendulous, the limbs feeble, the belly large.

Captain DUMONT D'URVILLE, in his first voyage in *L'Astrolabe*, 1826-29, and in the second voyage with *L'Astrolabe* and *La Zélée*, 1837-40, spent some time on the south coast of Tasmania. The naturalists to the first voyage, MM. QUOY and GAIMARD, said the natives|| had short, woolly hair, though the women frequently shaved the head; the skin was black, but the nose was not so flattened and the lips were not so thick and projecting as in the African negro. In the Atlas, a man and woman are figured with characteristic hair and with slender limbs. The black skin, the frizzled

* FLINDERS, *Voyage*, vol. i. p. 186.

† *Account of the English Colony*, vol. ii. p. 187, London, 1802.

‡ *Voyage in Search of La Prouse*, pp. 127, 295 et seq.

§ *Voyage de Découvertes, etc.*, vol. i. pp. 221, 226, 448; Atlas, plates viii. to xii.

|| DUMONT D'URVILLE, "Voyage de l'Astrolabe," *Zoologie*, vol. i. p. 45, Paris, 1830.

and woolly hair, the frizzled and abundant beard and moustache, were recognised by MM. HOMBRON and JACQUINOT, the naturalists in the second voyage.* DUMOUTIER, in the Anthropological volume,† described the face as massive; the eyes sunken; the nose voluminous, about one-quarter the height of the whole face; the mouth very large, but with moderately thick lips; the teeth large, the skin black, the hair woolly.

In the Atlas to the voyage were represented the busts of six Tasmanians, modelled at Hobart Town under the direction of DUMOUTIER, four from nature and two from previously modelled busts, also three skulls. The natives were from different parts of the island. In two the woolly hair was in ringlets, which covered the forehead and the cheeks; in the others it was short. Figures of two of these busts, showing differences in the length of the hair, have been reproduced by DE QUATREFAGES and HAMY in the *Crania Ethnica*. DUMOUTIER had subsequently the opportunity of studying the head of a native who died at Hobart Town, which was sent to Paris by M. EYDOUX of the corvette *Favorite*. The hair was frizzled, crisp, woolly, short, and very black; the beard black, eyebrows black and thick, eyeslit small, sclerotic yellowish; forehead sloping a little backward, projecting in its middle; parietal regions large, forehead by comparison singularly narrow; nose short, straight, and forming with the forehead a re-entering angle and acute as if broken at its origin; large nares with tip of nose large and rounded; supraciliary ridges very prominent in front of the eyes, which looked small and concealed in the orbits; jaws not specially projecting; lips moderately projecting. The head has been figured by GERVAIS in his work on Zoology and General Palæontology.

G. W. WALKER, who visited in 1832 the native settlement on Flinders Island, described the people as rather below the average stature of the English; complexion very dark, almost black, a few of almost a coppery hue, palms and soles lighter than their bodies; lips generally thick; nostrils flat and distended; hair uniformly black and woolly. BRETON in 1834, LAPLACE in 1835, confirmed the description of the skin, hair and features. R. H. DAVIES recorded in 1846 the customary character of the hair; the bluish-black colour of the skin; the narrow forehead; flat nose; wide nostrils; prominent jaws; wide mouth, large strong teeth. CALDER in 1874 spoke of the hair being plastered with grease and ochre, so that the locks resembled a bundle of painted ropes.

STRZELECKI in his account of Van Diemen's Land has figured an aboriginal man and woman. Portraits of natives were painted by Mr DUTERREAU of Hobart Town, some of which have been reproduced in BONWICK's *Last of the Tasmanians* and in LING ROTH's volume. In the majority the hair was represented short and woolly, but in a few of the men it was longer and arranged in short ringlets. Before the last survivors of the race had disappeared photographs were taken by WOOLLEY in 1866,‡ including William Lanné the last man, who died in 1869, and Truganina, the last woman, who died in 1877, which were reproduced in 1871 by GIGLIOLI and subsequently by other writers. They closely corresponded in their facial characters with the excellent description abstracted above

* "Voyage au Pol Sud," *Zoologie*, p. 320, t. i., Paris, 1846.

† *Idem*, *Anthropologie*, p. 134, Paris, 1854.

‡ Figured both in BONWICK's *Last of the Tasmanians* and in LING ROTH's *Treatise on the Aborigines of Tasmania*.

from DUMOUTIER. In the Museum of the Royal College of Surgeons in Ireland is the head of an aboriginal which has been figured by LING ROTH in his comprehensive work.

The data furnished by so many excellent observers, and extending at intervals over about a century of time, enable us to realise the external physical characters of the aborigines of Tasmania. Though differing in minor details, the descriptions correspond in their main features, which may be summarised as follows:—Skin black or very dark brown, often marked with cicatrices; hair black, frizzled, woolly, usually in short locks, though sometimes forming separate small ringlets, with abundant beard and whiskers; face short in relation to breadth, nose short, sunk at the root, not flattened, nostrils broad and full (Plate I. fig. 1); mouth large, lips moderately thick; eyes small and sunken; eyebrows overhanging; forehead narrow, in the men somewhat retreating; upper jaw somewhat projecting; stature moderate—one man measured 5 ft. 3 in. (CROZET), others seen by PÉRON were 5 ft. 2, 4 or 6 in., and one was said to be 5 ft. 10 in. (1 m. 786 mm.), but he was doubtless exceptional; whilst G. A. ROBINSON gave the measurements of twenty-three men as ranging from 5 ft. 1 in. to 5 ft. 7½ in., and of twenty-nine women from 4 ft 3 in. to 5 ft. 4½ in. FLOWER stated that the average height of three male skeletons was 5 ft. 3½ in., and that of a female 4 ft. 7½ in. The body was well developed and muscular, especially the buttocks; the limbs were slender, and the belly was proportionally large.

Those who had the opportunity of observing the living natives of Tasmania, naturally compared their appearance with that of other races of aborigines. CROZET considered the hair to be like that of the wool of Kaffirs. COOK stated that it was as woolly as that of any native of Guinea, and Surgeon ANDERSON, who accompanied him, thought that the Tasmanians resembled the natives of Tanna and Mallicollo. PÉRON was of opinion that the Tasmanians were altogether different from the Australians in physical characters. The short, woolly, frizzly hair contrasted with the long, straight hair of the Australians, and the colour of the skin was browner than in the latter. Owing undoubtedly to the skin being smeared with grease and charcoal, its precise natural colour was somewhat difficult to determine. CROZET stated that when washed it was reddish brown; PÉRON, as above stated, regarded it as inclining to brown; whilst such expressions as dull black, bluish black, perfectly black, sooty black, very dark almost black, not a very deep black, occur in the descriptions of other observers. QUOY and GAIMARD considered the Tasmanians as approaching the African negro, though the nose was not so flattened nor the lips so thick and protuberant; they were definitely different, they said, from the natives of South Australia, and still more from the Papuans, with whom they had no relations further than that of colour: they regarded them as a distinct race—an opinion concurred in by MM. HOMBRON and JACQUINOT, who, seeing that they believed in the special origin of the race, did not consider it necessary to inquire into their descent. DUMOUTIER stated that they bore the type of other Melanesians like the Fijians and the natives of New Guinea, but with certain differences; he considered that they should be referred to a negro race: the length of

the forearm and leg, their stature, gait, and the external characters generally, led him to take this view. WALKER in regard to their black, woolly hair held that in many respects they nearly resembled the African negro. DAVIES described the skin as less black than in the African negro, slightly more so than in Lascars, but the lips were not so full as in negroes.

RACIAL AFFINITIES AND DESCENT OF THE TASMANIANS.

Guided by the descriptions of the aborigines as seen by navigators, by the naturalists of the several expeditions, and by those who lived on the island and observed the natives for some years prior to their extinction, anthropologists have studied the question of the racial relations and descent of the Tasmanians, and have discussed their possible affinities to the Australians, to Negroes, Negritos, and to the Melanesian or black race of the great Pacific Archipelago.

In the discussion of this question special attention has to be paid to the geographical position of Tasmania, which, with the exception of the South Island of New Zealand, is the most southern land in the Oceanic area on which the older navigators met with human inhabitants. Though now separated by Bass's Straits from Australia, evidence of various kinds supports the view that in past times it was continuous with the Australian Continent. Bass's Straits, though varying in width between 100 and 120 miles, is a shallow sea, at the most not much more than 100 fathoms deep, and somewhat comparable in this respect to the North Sea, which now separates Great Britain from the continent of Europe. But in addition groups of islands are found in the Straits which form an imperfect land bridge between Tasmania and Australia. The consideration of the fauna, more especially the Marsupial mammals, supports the view of the previous continuity of the land. The early navigators frequently referred to the women of Tasmania as wearing the skin of the kangaroo on their backs, and the Tasmanian wolf (*Thylacinus cynocephalus*), the largest existing carnivorous marsupial, and the Tasmanian devil (*Sarcophilus ursinus*), though now confined to Tasmania, at one time lived in Australia, where their remains have been found. The Wombats (*Phascodomys*), the Opossum (*Trichosurus*), the Monotremes *Ornithorhynchus* and *Echidna* are still extant, both in Australia and Tasmania: in these respects, and in others which might be referred to, a strong affinity exists between the fauna in both regions.

In considering the origin of the human inhabitants we may put on one side the possibility of a special creation of the Tasmanians, though the naturalists who accompanied the expeditions of DUMONT D'URVILLE seemed to have favoured the hypothesis that they were a distinct species of man. There remains, therefore, the theory that the aborigines of Tasmania were descended from immigrants from other parts, and as the islands to the south were not populated, the migration would necessarily have been from the north.

The migrations of men for a long distance by land is a question of time and food supply, and if the impedimenta of travel are bulky and numerous, beasts of burden or other aids to locomotion are required. If migration takes place on water, properly constructed and sufficiently large craft for conveying man and his impedimenta are necessary. As the Tasmanians lived on an island it is important to inquire if they, and presumably their ancestors, were a seafaring people. The statement has sometimes been made that the natives had no canoes or other navigable craft, but this was not strictly in accordance with the evidence. For example, LA BILLARDIÈRE figured (pl. 46) and PÉRON described and figured (pl. xiv.) canoes on the south and west coasts made of rolls or strips of bark and bound together by thongs of reeds or grass, which could hold from two to four or five people. DUMONT D'URVILLE saw a raft or catamaran formed of two trunks of trees connected by transverse pieces, which could carry ten people and be propelled by long poles. Craft as above described were used on the rivers, to cross the mouths of the bays which indent the coast, or the narrow channels which separate the mainland from the small islands near the coast, but they would seem too fragile to contend against the strong winds and currents of the Straits of Bass. Bark canoes and rafts somewhat similar in character were also in use amongst the natives of the south and east coasts of Australia. In North Australia, however, where the natives were under the influence of the islanders in Torres Straits and the Papuans of New Guinea, canoes fifty feet long formed by hollowing out the trunk of the cotton tree, capable of holding twelve or fifteen persons and propelled by short paddles, or even a sail formed of palm leaves, were employed.* If Tasmania had been colonised originally by the people of New Guinea or other Oceanic islands, the art of constructing capacious seagoing canoes does not seem to have been transmitted by them to their descendants. But if colonised from Australia, the migration of man had without doubt taken place before the formation of Bass's Straits, along the surface of continuous land, which also served for the passage of the marsupial mammals common to both countries.

The comparison of the physical characters of the aborigines of Australia with the Tasmanians appropriately forms a subject of consideration. With scarcely an exception the early navigators recognised important differences in their external characters; similar opinions have been expressed by later observers, and the conclusion has been reached that the existing natives of Australia are distinct from the Tasmanians. In the Australians the hair is black, fairly long, wavy or almost straight; its shaft is ovoid, relatively thick and not flattened as is the case with the short, woolly, frizzled, finer hair of the Tasmanians, in whom the hair, though sometimes stained red with ochre or even bleached with lime, is usually described as black, though SYDNEY HICKSON has recently stated that it "is of a light golden-brown colour."† Well-formed beard and moustache were found both in Tasmanians and Australians. In the Australians the skin is a

* Chapter on Canoes in BROUGH SMYTH's work on the *Aborigines of Australia*, p. 407, vol. i.

† See description in LING ROTH's treatise, p. 226. Is it not likely that Professor HICKSON's specimen had been taken from hair that had been bleached?

chocolate-brown colour, though varying in its depth of tint; in the Tasmanians it was more definitely black, though from the recorded descriptions it varied in shade of colour. In the Australians the upper jaw was more prognathic, the lips were thicker, and the teeth were larger and stronger than in the Tasmanians.

As the skull furnishes important criteria for discriminating the physical characters of races, I purpose, in the next place, to institute a comparison between the skulls of the Tasmanians and those of the Australians and the other races in the Pacific area with which they have been compared. I have made use for this purpose of the representative collection of skulls in the Anatomical Museum of the University, for the most part formed during my tenure of office in the chair of Anatomy, and to which valuable additions have subsequently been made by my successor Professor CUNNINGHAM.

In my memoir "On Human Crania" in the "*Challenger*" Reports* I described the characters of forty-nine Australian skulls then in the Anatomical Museum, and compared them with the descriptions by BARNARD DAVIS, FLOWER, DE QUATREFAGES and HAMY, of the skulls in their collections.

The cranial vault in the Australians is strongly roof-shaped, though in some specimens from South Australia it is more flattened at the vertex. The parietal eminences are not specially prominent; the side walls approach the vertical; the crania are unusually long, the mean glabello-occipital diameter of twenty-three adult males being 191.6 mm.; they are relatively narrow in relation to the length, and the mean parieto-squamous breadth is 132 mm., which yields a cephalic index 68.8. The male crania, in the mean, are hyper-dolichocephalic; so that if one were to see a skull in a collection catalogued Australian, one would doubt the accuracy of its identification, if the cephalic index computed from the maximum length and breadth was in the higher or even the middle term of the mesaticephalic group. It is unnecessary for me to enter again into an examination of the relative breadth and height of the Australian crania, as they have been so fully detailed in my "*Challenger*" Report. It may be sufficient to state that from an analysis of one hundred and fifty crania in both sexes, in which these diameters were taken either by myself or by previous observers, the height was less than the breadth in fifty-one, these dimensions were equal in fifteen, and the height was greater than the breadth in eighty-five. Owing to the importance attached by TOPINARD, DE QUATREFAGES and HAMY to the special characters of the cranial vault in the Tasmanians, on which I have dwelt in my description of the skulls in the Edinburgh and other Museums, pp. 368, 376, I have re-examined the vault in sixty-one Australian skulls now in the University Museum. In forty-four from Queensland, New South Wales and Victoria, an antero-posterior depression on the parietal bone was only faintly indicated in a small minority, and scarcely perceptible on the frontal bone; whilst a sinking of the hinder part of the sagittal suture between a pair of feeble lateral ridges was only occasionally present. In nine skulls from South Australia four showed a parieto-frontal

* Part xxix., 1884; and part xlvii., 1886.

depression and three had the sagittal suture sunk behind between a pair of lateral ridges; whilst of eight skulls from West Australia five possessed similar features.

In the Australians the glabella and supraciliary ridges were usually more strongly marked than in the Tasmanians; the forehead was more receding; the upper jaw was more prognathous and in many Australian skulls the line of demarcation between the floor of the nose and the incisive region had almost or entirely disappeared, so that the nasal floor was directly continued into the incisive area of the maxilla; the roof of the mouth was more elongated, dolichuranic, and the premolar and molar borders of the two superior maxillæ were approximately parallel to each other; the lower jaw was stronger and the chin was more pronounced. In both races the skulls were phænozygous, platyrrhine, microseme, and microcephalic in their internal capacity.

From the consideration of these characters the skulls support the opinion, based on the study by so many observers of the external features, that the existing aborigines of Australia are distinct from the Tasmanians, although the presence, in a proportion of the natives of South and West Australia, of skulls in which the height was less than the breadth, the not unfrequent sunk sagittal suture, the more marked parietal eminences, and the antero-posterior parietal depressions, point to a possible amount of intermixture and racial affinity of these Australian tribes with the Tasmanians.

TOPINARD, in his *Étude sur les Race Indigènes de l'Australie*, came to the conclusion that in some parts of Australia, in addition to the general body of aborigines, tribes existed with woolly hair, black skins, short stature, small round skulls, very prognathic jaws, generally speaking with Negro characters, distinct in features from the recognised Australian type, and inferior in intelligence. The woolly-haired race, he thought, preceded the more straight-haired taller natives, and, probably when displaced by them, took refuge, in part at least, in Tasmania. TOPINARD therefore inferred that, when the displacement occurred, whilst reasons could be given for regarding the Tasmanians as the remains of an autochthonous race, originally pure and distinct from its neighbours, others equally valid might be alleged for their multiple origin as a cross between a black autochthonous race and one of the invading groups of the great Polynesian family. But whatever may be thought of the descent of the Tasmanians from a woolly-haired Australian autochthone, there does not seem to be satisfactory evidence of the presence in that great country of woolly-haired tribes at the present time, or since Australia became known to Europeans. The balance of opinion is indeed in favour of the view that throughout Australia the present natives generally conform to one pattern in features, colour, and mental character; though possibly on the coast, local infusion of Papuan, Polynesian or Malay blood may from time to time have been introduced amongst them. Indeed, as GIGLIOLI has suggested, the idea of an existing woolly-haired race in Australia is probably due to the loose way in which the terms woolly and crisp have been used by explorers who were not anthropologists.

The aborigines of Australia as known to the British colonists present in their affinities and descent, equally with the aborigines of Tasmania, an ethnological problem. They

have racial characters which distinguish them from the dolichocephalic, mop-haired, black-skinned Papuans and Melanesians; from the brachycephalic, brown-skinned Polynesians; from the brachycephalic, straight black-haired, yellow-skinned Malays; and from the brachycephalic, woolly-haired, black-skinned, dwarf-like Negritos. Whilst in the great islands of Malaya various tribes, collectively termed Indonesians, are found, with skins brown in colour, varying in depth of tint to almost black, long, straight black hair, stature from 5 ft. 2 in. to 5 ft. 4 in; with the head and skull dolichocephalic or approximating thereto; the mean height and breadth of the skull almost equal; the glabella and supraciliary ridges moderate; the nose moderately wide at the nostrils; the face moderate in height and width, the upper jaw not very projecting; the orbits tending to be rounded in form, and the hard palate with a wide and shallow arch,*—characters which collectively distinguish them from the Australians.

CROZET considered the hair of the Tasmanians to be like the "wool" of Kaffirs, and Captain COOK compared it with that of the West African Negro. In most other respects the physical and other differences are marked, and as Africa is separated from Tasmania by a wide and deep ocean, migration from one country to the other in the early stages of human history seems to have been impossible.

In New Guinea and many other Oceanic islands, and in the extensive range of Asiatic islands reaching westwards to the Indian Ocean, people with black skins and other negro characters are found. Sometimes they are spoken of collectively as Negritos, and the term Negritic by some ethnologists has been made to include even the black Dravidian people of Southern India. In my judgment, however, the extension of the term is unfortunate, as it would embrace races which, although they resemble each other in the colour of the skin, differ greatly in many other respects.

The term Negrito should be limited to such black-skinned, woolly-haired people with small brachycephalic heads, jaws not very projecting, nose not so flattened, nostrils not so wide as in the Negro, and of dwarf-like stature, characteristic of the people who under the name Semangs inhabit the Malay Peninsula, or as the Mincopies occupy the Andaman Islands, and as the Aetas are found in some of the Philippine Islands.

It is not impossible that a migration of the Negritos eastwards into the Oceanic area may have taken place in bygone time. It was shown by G. W. EARL in 1845, and subsequently by A. R. WALLACE, that only a shallow sea from 40 to 100 fathoms deep, which indicated a recent land connection, separated the Malay Peninsula from the great islands Sumatra, Borneo, Java, which extended northwards towards the Philippine Islands, and that similar shallow straits lie between New Guinea, the islands in Torres Straits, and Australia. It would seem, therefore, that Asia and Australia at one time had been connected with each other through the chain of islands. A. R. WALLACE came to the conclusion that a band of deeper sea between Borneo and Celebes divided the islands into two groups—a western Indo-Malayan, the natural productions in which resembled those

* See my Memoir on the Craniology of the Natives of Borneo, etc., in *Trans. Roy. Soc. Edin.*, vol. xlv., part iii., 1907.

of Asia, and an eastern Austro-Malayan, the productions in which corresponded with those of New Guinea and Australia.

On the supposition that a Negrito population, instead of being limited as at present to a few widely separated localities, had formerly been generally distributed throughout Malaya, a migration eastward by land, before it subsided at the shallow straits, was within the limitations of travel. It is also said that the Andaman islanders have canoes hollowed out of single trees, and are expert in their management. If this were general with those Negritos, who lived in proximity to the sea, migration across the narrow intervening straits was within the power of these people.

The inhabitants of New Guinea are the Papuans, and a similar black-skinned race, known generally as Melanesians, occupies groups of islands to the east and north of New Guinea. In their external characters they are distinguished from the Negritos by much longer hair, frizzled at the free end, which may either be arranged as a mop around the head, or be divided into locks which hang down on the shoulders, or be sometimes tied together to form a top knot on the head; the beard also is well developed. They are taller than the Negritos, and are superior to them, both physically and intellectually.

Some years ago I described a number of Papuan crania from New Guinea, and reviewed the literature of the subject.*

The University Museum contains twenty-three skulls which, with one or two exceptions, were collected on the south and the east end of the island. Sixteen had the cephalic index 75 or less, with the mean index 70·8, strongly therefore dolichocephalic; three were mesaticephalic, and four were brachycephalic, the wider skulls being perhaps due to an intermixture with Malay or Polynesian immigrants. The dolichocephalic crania were relatively narrow; the glabella and supraciliary ridges were moderately projecting; the nasion was not greatly depressed; the parietal eminences were not strongly projecting; the cranial vault in some was roof-shaped, but the longitudinal fronto-parietal depression, so characteristic in the Tasmanians, was only feebly indicated in a small minority of the skulls. In six of the crania a shallow depression of the sagittal suture in the postero-parietal region was also apparent. Although in the majority of the Papuan dolichocephali the basi-bregmatic height exceeded the greatest breadth, in some others the height was a little less than the breadth. The mean vertical index of these skulls was 73·2. In the dolichocephalic form and proportions, in the height being usually greater than the breadth, and in the dominancy of the parietal longitudinal arc over the frontal and occipital arcs, the skulls showed Melanesian characters. It is doubtful if short, woolly-haired Negrito tribes, as defined in a previous paragraph, at present exist in New Guinea.

The islands of the Admiralty group are inhabited by Melanesians with black-brown skins and mop-like hair. The museum contains twelve skulls collected by the "*Challenger*."† Each cranium was dolichocephalic, and the mean cephalic index was 70.

* "*Challenger*" Reports, p. 81, part xxix., 1884; and *Proc. Roy. Soc. Edin.*, p. 553, vol. xxii., 1900.

† Described by me in "*Challenger*" Reports, part xxix., 1884.

With three exceptions the height was greater than the breadth, and the mean vertical index was 72. The glabella, supraciliary ridges and parietal eminences, though distinct, were not specially prominent; the nasion was not greatly depressed; the cranial vault was roof-shaped, but the fronto-parietal longitudinal depression was only faintly indicated in a few specimens. Two skulls of this group showed indications of a depressed sagittal suture in the postero-parietal region.

The natives of the Fiji islands to the north-east of New Guinea have as a rule marked Melanesian features. Their crania have been carefully described by several anthropologists. Although a proportion of the skulls, collected on the sea-coast, possesses mesaticephalic or occasionally brachycephalic proportions, where a Polynesian brachycephalic intermixture is probable, the natives of the interior, as FLOWER has shown, are strongly dolichocephalic. The crania are long, narrow, and high, as in the hypsistenocephalic group of BARNARD DAVIS. Five crania are in the University Museum, two of which are hyperdolichocephalic (C. IX. 66.8 and 65.7), with the basi-bregmatic height much exceeding the greatest breadth; one is mesaticephalic (C. IX. 76.4), with a vertical index 77.5, and two are brachycephalic (C. IX. 81.9, 82.4), in one of which the height is greater and in the other less than the breadth. In these skulls the sagittal suture was not depressed, and only faint indications of a longitudinal fronto-parietal depression were seen.

The New Caledonian group of islands constitutes the most southerly land occupied by people of a well-marked Melanesian type. Their crania have been described by several French and British anthropologists, and most recently by Dr DAVID WATERSTON, the measurements of many of which he has kindly supplied me with from a collection in the University Museum presented by Dr W. RAMSAY SMITH. Fourteen skulls in the museum are characteristically Melanesian, long, narrow, and high, the vault roof-shaped, and the parietal eminences not prominent. In three of the skulls an antero-posterior depression in the parietal region extended, though faintly marked, on to the frontal. In three skulls the sagittal suture was depressed in the post-parietal region. In six males the glabella and supraciliaries were prominent, and the nasion was depressed. Except in one with C. IX. 77, the skulls were dolichocephalic; the mean cephalic index was 70.1, and as the mean vertical index was 73, the skulls were hypsistenocephalic. The mean nasal height was 47.3 mm., the nasal index in two was leptorhine, in six mesorhine, and in six platyrhine, the mean index of the series being 52.9, scarcely platyrhine. In five skulls the orbits were low with a microseme index, in seven the orbits were rounded at the aperture, and in them the index ranged from 89.7 to 97.3, *i.e.* megaseme. The mean orbital index of the series was mesoseme, 86.1.

Professor HUXLEY, in his writings on the Distribution of Mankind, advocated the view that the Negrito type spread eastwards from Asia into New Guinea, the New Hebrides, the Solomon Islands, the Fijis and New Caledonia. From New Caledonia they migrated southwards to Tasmania, in all probability by intermediate land, which he thought might have been islands now submerged, separated from

each other by short sea passages, though an extension eastward of the present Australian continent would also have supplied a land route.

New Caledonia was thus regarded as almost the limit of the eastward migration of the Negritos, and also as the centre from which the Tasmanian migration started; and it will consequently be interesting to compare the crania of the New Caledonians with the Asiatic Negritos on the one hand, and with the Tasmanians on the other. One can scarcely conceive a greater cranial contrast than is presented by the skull of an Andaman Island Negrito and that of a New Caledonian Melanesian.

The University Museum contains eight skulls from the Andaman Islands. In the Andaman Negrito the skull is small, rounded, brachycephalic (mean C. *Ix.* 81.5); broad in the parietal region owing to the prominent eminences: the basi-bregmatic height is distinctly less than the greatest breadth (mean V. *Ix.* 75.7); the vault of the cranium is neither keeled, nor roof-shaped, nor marked by a longitudinal fronto-parietal depression on each side, but is somewhat flattened and with a low transverse arc; the skulls are cryptozygous. The forehead is smooth, and not retreating, with feeble glabella and supraciliaries, but with distinct frontal eminences; the nasion is not depressed, the nose is not broad and flattened; the nasal index is usually platyrrhine; the orbits are moderately high in relation to the width, the index being mesoseme; the projection of the upper jaw is moderate, the facial profile is almost straight; the cranial capacity is small.* In the postero-parietal region a broad, shallow, median, depressed area exists, bounded laterally by a low ridge on the parietal bone, and along the middle of this depression the sagittal suture lies sunk below the general plane of the vault.

The New Caledonian skulls, on the other hand, are much longer, and relatively narrower, markedly dolichocephalic (mean C. *Ix.* 70.1); the height is greater than the breadth (mean V. *Ix.* 73); the vault is roof-shaped; the skull is usually phænozygous; in the males the glabella and supraciliaries are strong, the frontal eminences are not prominent, the forehead is retreating; the jaws are generally prognathic and the facial profile is oblique. The Andaman Negrito and the New Caledonian are not unlike in the proportion of the height to the width of the nose, and the dimensions of their orbits give a mesoseme index. Both as regards capacity are microcephalic. But the short, black, woolly hair of the Andaman islander and his dwarf-like stature, 4 ft. 8 in. to 5 ft. in the men, contrast with the longer black hair, frizzled at the free ends and capable of being dressed into a mop-like mass, and with the stature, 5 ft. 5 or 6 inches, of the New Caledonian. If the assumption be correct that the New Caledonian is of Negrito descent, it will have to be admitted that a remarkable modification, both in external characters and in skull form, must have taken place since the Asiatic Negrito was transplanted to an Oceanic habitat; and it would, I think, be difficult to advance a sufficient reason from the influence of climate, food, altitude, or other factors in the

* See W. H. FLOWER'S *Memoirs*, *Journ. Anthropol. Inst.*, November 1879 and November 1884. Also my description in *Trans. Roy. Soc. Edin.*, vol. xl. p. 113, 1901.

environment, to account for the origin of physical differences, which have conferred on these people such marked racial distinctions as we recognise to exist between them.

If we now proceed to the comparison of the aboriginal Tasmanian with the New Caledonian, interesting points are to be noted. They agreed generally as to stature and the colour of the skin, but in the Tasmanian the hair was short and woolly, not long and mop-like. The Tasmanian skull was not strongly dolichocephalic, for though the majority had the cephalic index either below 75 or in the lower term of the mesaticephali, in about one-sixth the index was in the higher mesaticephalic group, and the mean index in sixty-nine skulls was 74·7, the greater relative breadth in the Tasmanian being due to the prominent parietal eminences. The Tasmanian skulls did not show the almost uniform excess of height over breadth which was seen in the New Caledonians, and which gave to the latter a high rank in the hypsistenocephalic Melanesians. On the contrary, in the Tasmanians the height was usually less than the breadth, and the skulls generally were broad, low skulls, platychemæcephalic. The cranial vault was roof-shaped in both, but the New Caledonian did not show the fronto-parietal longitudinal depression so frequently, or to such a degree, as the Tasmanian, neither was the depression of the sagittal suture in the post-parietal region so often seen. The nose was shorter and with broader nostrils, the orbits were lower, the upper orbital region was more massive, the upper jaw was scarcely so prognathous and the lower jaw was not so strong in the Tasmanian as in the New Caledonian. The forehead, glabella, and supraciliary ridges were not unlike in both series. The skulls of the New Caledonians approximated more in their characters to the Australians than to the Tasmanians, though distinguishable from both.

These differences lead one to think that the Tasmanian was not in direct descent from the Melanesians as we know them at the present day. In important respects his physical characters were more nearly allied to the Asiatic Negritos. Though the Tasmanian skull as a rule has a dolichocephalic length-breadth index, yet in the mean 74·7 it approaches the mesaticephalic group. In both the parietal eminences are prominent, the basibregmatic height is less than the greatest breadth, the sagittal suture is often depressed below the general plane of the vault of the cranium, and in these respects the skulls approximate to the platychemæcephalic cranial type of the Negrito, and the woolly hair of the one is comparable with that of the other. In stature, however, the Tasmanian was not a dwarf.

The whole question of the descent of the Tasmanians is one of great complexity and difficulty, which has been much discussed by ethnologists. HUXLEY considered them to be the Negrito modification of the great Negroid type or division of mankind, which had migrated eastwards to New Caledonia and subsequently southwards to Tasmania. TOPINARD, whilst of opinion that they were the remains of an autochthonous race, recognised that they might be a cross between it and an invading member of the Polynesian family. BARNARD DAVIS regarded them as a peculiar and distinct race, dwelling in their own island. DE QUATREFAGES and HAMY said that, owing to their special characters, they had no affinities with any other race, and that they formed a

distinct subdivision of the black races. FLOWER thought them to be aberrant members of the Melanesian group modified from the original type. LING ROTH considered that the physical characters, manners, customs, mental qualities and language of the Tasmanians supported the theory that they were the aboriginal inhabitants of Australia, in course of time displaced by the present straight-haired Australian natives.

If the Tasmanian occupied his island when it formed continuous land with Australia, and arrived in it along with the marsupial mammals, his advent would go back to a time before land and water had assumed their present relations, thousands of years ago. If a great migration eastwards from Asia of the early Negritos did take place, they may at that period have reached Tasmania by way of the Australian continent. Though, as has already been stated, a woolly-haired race is not now represented in Australia, the tendency of the South Australians to show Tasmanian characters in the cranial vault is worthy of consideration in this particular, as an indication of the probable route of migration and of racial affinity.

When the level of land and water changed and the formation of Bass's Straits severed the two countries, Tasmania became isolated. Hence arose a condition, specially emphasised by Sir WM. FLOWER, in which their geographical position, outside the track of commerce and civilisation, precluded the Tasmanians from being crossed with and influenced by other races. Close inter-breeding was thus necessitated, which during the centuries and in a limited population would intensify, perpetuate, and give permanency to physical and other characters which might arise from time to time amongst them, and would accentuate differences between them and the parent stock from which they had sprung. Hence the Tasmanians would assume characters which would give them the aspect of a race distinct from the other races in more or less proximity to them. The evidence seems to be in favour of the descent of the Tasmanians from a primitive Negrito stock, which migrated across Australia, rather than by the route of the Melanesian Oceanic islands lying to the north and east of the Australian continent.

SAGITTAL CONTOURS.

In my memoir on the Crania collected by the "Challenger" and in several subsequent publications I have figured vertical antero-posterior sections of skulls, made immediately on one side of the mesial plane, and I have stated the diameter of the lines radiating from the basion across the cranial cavity, to definite points on the surface of the skull, as well as certain other measurements.

In the third part of my memoir on Indian crania and in that on skulls from Borneo and other parts of Malaya I marked out a nasio-tentorial plane (*n.t.*) drawn from the nasion to the upper border of the groove for the lateral sinus, which divided the cranial cavity into a cerebral part above this plane, and a basal part for the lodgment of the cerebellum, pons, and medulla. Four of the radii from the basion intersected this plane, and divided the cerebral part of the cavity into regions which approximately represented the position

and relative size of the frontal, parietal and occipital lobes of the cerebrum. The point at which each radius intersected this plane is its tentorial point, and the segment of the radius which extends from this point to the vault is its tentorial segment. The tentorial segment of the basi-perpendicular radius, from the basion to a point on the cranial vault behind the bregma, drawn at right angles to the plane of the foramen magnum, has a general relation to the fissure of Rolando, in front of which is the frontal lobe: between the tentorio-perpendicular and tentorio-lambda radii are the parietal and the upper end of the temporal lobe: behind the tentorio-lambda radius is the occipital lobe.

In this memoir, instead of making sections of the skulls and reproducing the surface of section, I obtained tracings with Lissauer's apparatus of the cranial vault from the opisthion to the nasion, and by marking the position of the basion I have obtained the radial as well as the other measurements above referred to, and I have indicated by the dotted line the position of the foramen magnum (figs. 2, 3, 4, 5, 6, 7, p. 396).

KLAATSCH, in a recent memoir,* has figured some Tasmanian skulls in the London and Paris museums traced with his diagraph. He has taken the glabella as a centre from which to draw lines to the bregma, lambda, occipital point and inion. From the glabella-inion line he has taken the height to the bregma, to the vault behind the bregma and to the lambda, as well as the chord of the arc from the glabella to the bregma. In relation to these radii he has measured the bregma angle and other angles. In addition to the Tasmanian skulls similar measurements of skulls of Australians, Europeans, and other nationalities have been recorded in his tables.

The glabella, owing to variations in its size and the degree of projection in individuals and in races, exercises an important influence on the character of the physiognomy, and is now almost universally employed as the point in front from which to measure the maximum length of the skull and the head, in the determination of the length-breadth or cephalic index. The range of variation in its projection, associated in a more or less degree with the development of the frontal sinuses, unfits it to be used for taking the point in front from which to estimate the length of the cerebral part of the cranial cavity.

As I desire to employ measurements which, as far as is consistent with the difference between a sagittal section and a sagittal contour, will enable a comparison to be made between the skulls now described and those studied in my previous memoirs, I have continued to employ the nasio-tentorial plane, and in Table III. I have stated the radial and other measurements previously adopted. Six of the male Tasmanian skulls were selected for this purpose, and they are designated by numbers corresponding to those specified in Table I. The contour of the vault of these skulls, Nos. 1, 2, 5, 6, 7, 10,† together with the lines of measurement, have been reproduced in Figs. 2, 3, 4, 5, 6, 7.

* *Zeitschrift für Ethnologie*, Heft 6, p. 875, 1903.

† No. 3 is that of a female, in No. 4 the skull-cap was loose, Nos. 8 and 9 were fragmentary; they are not figured.

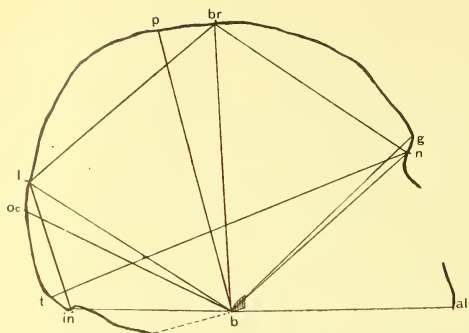


FIG. 2.—Tasmanian, xxx. No. 1.

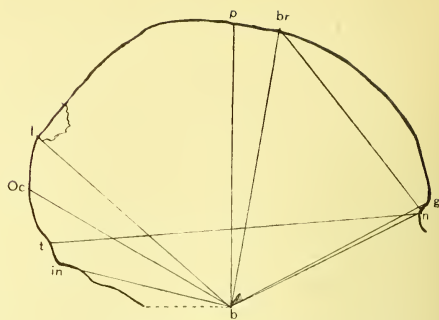


FIG. 3.—Tasmanian, xxx. No. 2.

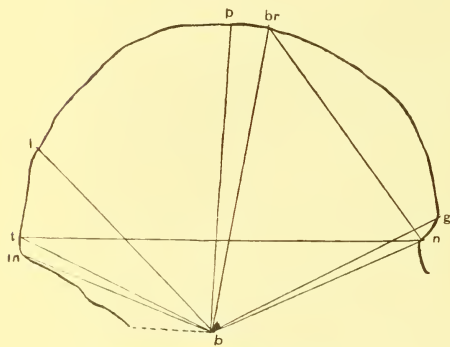


FIG. 4.—Tasmanian, xxx. No. 5.

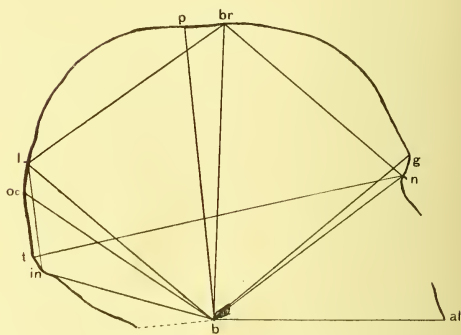


FIG. 5.—Tasmanian, xxx. No. 6.

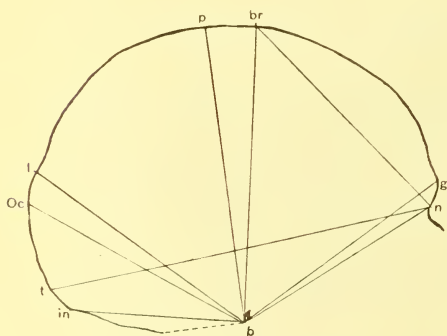


FIG. 6.—Tasmanian xxx. No. 7.

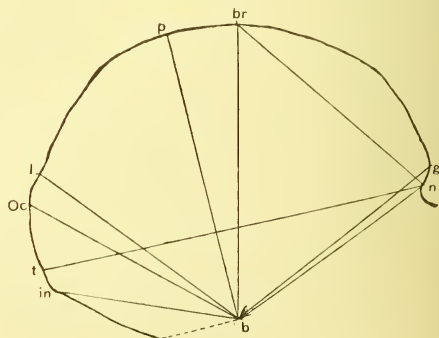


FIG. 7.—Tasmanian, xxx. No. 10.

TABLE III.
Tasmanian Sagittal Contours.

| | MONRO. No. 1. | No. 2. | No. 5. | No. 6. | No. 7. | JAMESON. No. 10. |
|--|------------------|--------|--------|--------|--------|---------------------|
| Basi-inial radius, <i>b.i.</i> | 73 mm. | 81 mm. | 88 mm. | 81 mm. | 80 mm. | 80 mm. |
| "-occipital radius, <i>b.oc.</i> | 100 " | 106 " | 91 " | 104 " | 113 " | 102 " |
| "-lambdal, <i>b.l.</i> | 107 " | 117 " | 107 " | 110 " | 117 " | 105 " |
| "-perpendicular radius, <i>b.p.</i> | 133 " | 130 " | 131 " | 134 " | 137 " | 126 " |
| "-bregmatic, <i>b.br.</i> | 132 " | 129 " | 133 " | 134 " | 136 " | 125 " |
| "-glabellar, <i>b.g.</i> | 118 " | 104 " | 109 " | 117 " | 110 " | 105 " |
| "-nasial, <i>b.n.</i> | 107 " | 101 " | 96 " | 107 " | 100 " | 96 " |
| "-alveolar, <i>b.al.</i> | 105 " | 98 " | 94 " | 108 " | 101 " | 101 " |
| Nasio-tentorial plane, <i>n.t.</i> | 176 " | 172 " | 172 " | 173 " | 178 " | 166 " |
| Tentorio-bregmatic segment, | 92 " | 92 " | 92 " | 87 " | 101 " | 87 " |
| "-perpendicular " | 94 " | 94 " | 92 " | 87 " | 103 " | 88 " |
| "-lambdal " | 62 " | 68 " | 54 " | 53 " | 73 " | 54 " |
| "-occipital " | 47 " | 45 " | ... | 41 " | 62 " | 44 " |
| From perpendicular radius to point on arch of frontal above glabella, | 99 " | 89 " | 92 " | 93 " | 95 " | 97 " |
| From perpendicular radius to occipital point, | 80 " | 95 " | 88 " | 80 " | 92 " | 76 " |
| Collective height of four diameters from tentorial plane, | 295 " | 299 " | 238 " | 268 " | 339 " | 273 " |
| Total length and collective height, | 474 " | 483 " | 418 " | 441 " | 526 " | 446 " |
| Parieto-squamous breadth, | 130 " | 139 " | 134 " | 125 " | 141 " | 127 " |
| Collective height, length, breadth, | 604 " | 622 " | 552 " | 566 " | 667 " | 573 " |

A comparison of these tracings and of the measurements in Table III. may be made with the figures 1-10 in plates vi., vii. of my "Challenger" Report, 1884, in which Australians, an Admiralty Islander, other Oceanic crania, etc. are represented, and with table xviii. (p. 120) in which the radial measurements are given; also with my memoirs on the Craniology of the People of Scotland, pl. v. figs. 21-26, and table xvii., p. 609; the Craniology of the People of India, part ii., p. 128, and part iii., pp. 303, 308; the Craniology of the People of Borneo and other parts of Malaya, pl. xlv. figs. 27-29, and table iv., p. 806.

Owing to the contour tracings being on the outer surface of the vault, the length of the cerebral cavity cannot be stated precisely, as in two previous memoirs, when sagittal sections were reproduced, but the distance from the perpendicular radius to the frontal and the occipital points affords an indication of its long diameter; neither can the height of the cavity estimated by the collective tentorio-bregmatic, -perpendicular, -lambdal, and -occipital diameters be precisely given; but, subject to the deduction of five or six millimetres, representing the thickness of the skull, from each diameter, the figures given in Table III. express approximately the length and height of the cerebral cavity. The greatest breadth of the cavity, although not capable of being measured in an antero-posterior contour tracing, may, subject to a deduction for the thickness of the skull, be estimated from the parieto-squamous diameter. By adding this diameter to those of the four diameters taken from the tentorial plane to the points specified on the surface

of the vault, together with the long diameter from the perpendicular radius to the frontal and occipital points, a numerical statement can be obtained for each skull of the relative proportion of the cranial cavity occupied by the cerebrum proper, and a comparison of its magnitude in the several skulls can be made. The series of six male skulls ranged from 552 mm. in No. 5 to 667 mm. in No. 7.

If the length of the radii from the basion to the inion, to the occipital point, lambda, perpendicular point, and bregma, were conjoined with the parieto-squamous breadth and with the long diameter from the occipital to the frontal points, a comparative estimate of the internal capacity of the entire cranium in each skull could be formed. It is unnecessary, however, to compute the cranial capacity in this way, as I have stated in Table I., p. 367, the exact amount, as determined with shot, by the method which I am in the habit of pursuing. It will be seen that No. 7, with the largest cranial capacity, 1430 c.c., had also the highest measurement, 667 mm., for the cerebral portion of the cavity, whilst No. 5, with an internal capacity 1140 c.c., and No. 10 with 1100 c.c., had space for the cerebrum indicated by 552 and 573 mm. respectively.

In recent memoirs by Professors CUNNINGHAM, SCHWALBE, and KLAATSCH, the curvature of the arc of the frontal bone in the Neanderthal and other prehistoric skulls has been compared with the same region in the crania of savage and civilised men. The method employed has been to draw a chord from the bregma either to the nasion or to the glabella, and to erect a perpendicular line from this chord to the most prominent part of the frontal arc, the degree of curvature of which influences the length of the line. Some time ago I adopted the method of CUNNINGHAM, and in Part III. of my contributions to Indian Craniology, and in my account of crania from Borneo and other parts of Malaya, I measured the chord from the nasion to the bregma, and took the length of a perpendicular line from it to the most projecting part of the frontal arc. In this memoir I have continued this practice, and have taken, in addition, the chord of the arc of the parietal bone from bregma to lambda, and that of the occipital from lambda to inion.* In each case I have erected a perpendicular to the most prominent part of the arch of each bone. The results of the measurements of six male Tasmanians are given in Table IV.

TABLE IV.

| | MONRO. No. 1. 109 mm. | No. 2. 105 mm. | No. 5. 111 mm. | No. 6. 107 mm. | No. 7. 115 mm. | JAMESON. No. 10. 105 mm. |
|--|-----------------------------|-------------------|-------------------|-------------------|-------------------|--------------------------------|
| Nasio-bregmatic chord of frontal, <i>br.n.</i> , | | | | | | |
| Perpendicular therefrom to outer sur- | | | | | | |
| face of bone, | 23 " | 20 " | 27 " | 25 " | 25 " | 24 " |
| Bregma-lambdal chord of parietal, <i>br.l.</i> , | 112 " | 121 " | 112 " | 110 " | 121 " | 106 " |
| Perpendicular therefrom to outer sur- | | | | | | |
| face of bone, | 26 " | 26 " | 22 " | 25 " | 25 " | 21 " |
| Lambda-inial chord of occipital, <i>lin.</i> , | 62 " | 60 " | 46 " | 51 " | 66 " | 51 " |
| Perpendicular therefrom to outer sur- | | | | | | |
| face of bone, | 10 " | 9 " | 3 " | 4 " | 10 " | 7 " |

* In my "Challenger" Report 1884 the chords of the frontal, parietal and occipital arcs of several skulls are given in table xix. The mean of three Australian skulls was: frontal chord 112.6, parietal 118.3, occipital 92.3.

The length of the nasio-bregmatic chord varied from 105 to 115 mm., with the mean 108·5 mm., a measure which closely corresponded with the mean 108 of the chord of the arc of the Indian crania given in Table VI. of Part III. (*supra cit.*). The length of the perpendicular erected from this chord in the Tasmanians ranged from 20 to 27 mm.; but the mean 24 mm. of the six skulls was less than the mean, 26·7 mm., in eight Indian skulls, and materially below the length, 27 mm. and 28 mm. respectively, of the two Scottish skulls recorded in the same table.

The bregma-lambdal chord of the parietal bone ranged from 106 mm., to 121 mm., with the mean 113·6 mm. The perpendicular therefrom to the highest part of the bone ranged from 21 to 26 mm., with the mean 24·1 mm., which closely corresponded with the mean of the projection of the frontal bone, and showed that these bones had almost similar curvatures.

The lambda-inial chord of the occipital bone ranged from 46 to 66 mm., with the mean 56 mm. The perpendicular therefrom ranged from 3 to 10 mm., with the mean 7·1 mm. These figures confirmed the statements made in the description of the occipital region of these skulls (p. 370), of the feeble projection of the occipital squama in the males, and of the short diameter from lambda to inion. In connection with the occipital region in the Tasmanian skulls, I recall a paper which I published in 1864, when the Neanderthal skull began to be the subject of controversy. Professor HUXLEY had directed attention to the characters of this skull, and had shown that not only the frontal but the occipital region possessed remarkable features, for the inial protuberance formed in it the posterior pole of the skull so that the squama sloped upwards and forwards and the occipital lobe of the brain would have been flattened and diminished. I investigated at that time both the frontal and occipital regions in the Australian and Tasmanian crania then in the Anatomical Museum of the University, and recognised a form of the occipital squama similar to that of the Neanderthal skull in some of the specimens. I also pointed out that it would be possible to arrange a series of modern British skulls in which variations from a well-marked occipital bulging to a form closely approaching that of the Neanderthal skull could be seen.

In Table I. the total longitudinal circumference of the skulls is given, computed from the total longitudinal arc, the length of the foramen magnum and the basi-nasal diameter. Two of these factors, viz. the length of the foramen magnum and the basi-nasal diameter, constitute the "base-line" of CLELAND, and in Table V. the proportion of the base-line to the total longitudinal arc, and to the total longitudinal circumference of the skull, is shown.

TABLE V.

| | No. 1. | No. 2. | No. 5. | No. 6. | No. 7. | No. 10. |
|---------------------------------------|---------|---------|---------|---------|---------|---------|
| Base line of male Tasmanian skulls, . | 143 mm. | 138 mm. | 120 mm. | 140 mm. | 135 mm. | 131 mm. |
| Total longitudinal arc, . . . | 358 " | 356 " | 357 " | 359 " | 382 " | 342 " |
| Longitudinal circumference, . . | 501 " | 494 " | 487 " | 499 " | 517 " | 473 " |
| Base-line to longitudinal arc, . . | 2·5 " | 2·5 " | 2·9 " | 2·5 " | 2·8 " | 2·6 " |
| " " " circumference, . . . | 3·5 " | 3·5 " | 4·0 " | 3·5 " | 3·8 " | 3·6 " |

The mean length of the base-line was 134·5 mm., that of the total longitudinal arc 359 mm., and that of the total longitudinal circumference 495 mm. The range in the proportion of base-line to the longitudinal arc varied in the Tasmanian skulls from 2·5 to 2·9, with the mean 2·63; whilst the proportion to the longitudinal circumference ranged from 3·5 to 4, with the mean 3·65. The skull No. 5 was that which possessed the greatest proportion of base-line both to the longitudinal arc and to the circumference.

I have elsewhere shown that the mean base-line in seventeen Scottish skulls was to the arc as 1 to 2·8, and in twenty male Australians as 1 to 2·7. The larger the proportion of arc to base-line the greater is the curvature of the vault of the skull for the lodgment of the cerebrum.

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EXPLANATION OF PLATES I.-III.

The process blocks are reproduced from photographs of the objects prepared by Mr Ernest J. Henderson of the Anatomical Museum.

PLATE I.

FIG. 1. Face of a Tasmanian from a mask in wax in the Anatomical Museum.

FIGS. 2, 3, 4. Fronto-parietal views of three male Tasmanian skulls to show the characters of the vault, page 369. FIG. 2, the skull No. 2 in Table I.; fig. 3, the skull No. 5; fig. 4, the skull in the collection formed by Professor Jameson, numbered 10 in that Table.

PLATE II.

FIG. 5. Norma verticalis of the skull from the Monro collection, No. 1 in the Table. This is the only touched photograph.

FIG 6. Norma lateralis of the same skull.

„ 7. Norma facialis of the same skull.

„ 8. Norma lateralis of the skull No. 10 from the Jameson collection.

PLATE III.

FIG. 9. Norma verticalis of skull, No. 10 from the Jameson collection.

„ 10. Norma lateralis of the same skull.

„ 11. Norma facialis of female skull, No. 3 in Table I.

„ 12. Norma lateralis of the same skull.

EXPLANATION OF FIGURES IN TEXT.

FIG. 1, page 369. Tracings of transverse arcs of No. 10: *f*, 35 mm. in front of bregma; *ap*, 1 cm. behind bregma; *mp*, about the middle of the parietal eminences.

FIGS. 2 to 7, page 396. Mesial sagittal tracings of six male Tasmanian skulls.

| | | | | |
|--------------|-----------------|---------|--------------|------------------------|
| <i>b.</i> | Basion. | | <i>b.oc.</i> | Basi-occipital radius. |
| <i>b.al.</i> | Basi-alveolar | radius. | <i>b.in.</i> | „ -inial „ |
| <i>b.n.</i> | „ nasal | „ | <i>n.t.</i> | nasio-tentorial plane. |
| <i>b.g.</i> | „ glabellar | „ | <i>n.br.</i> | „ -bregmatic chord. |
| <i>b.br.</i> | „ bregmatic | „ | <i>br.l.</i> | bregma-lambdal „ |
| <i>b.p.</i> | „ perpendicular | „ | <i>l.in.</i> | -lambda-inial „ |
| <i>b.l.</i> | „ lambdal | „ | | |

The dotted line is the plane of the foramen magnum. The serrated line in fig. 3 is the outline of a Wormian bone.

SIR WILLIAM TURNER on "Craniology of the Aborigines of Tasmania."—PLATE I.



FIG. 1.—Face of Tasmanian.

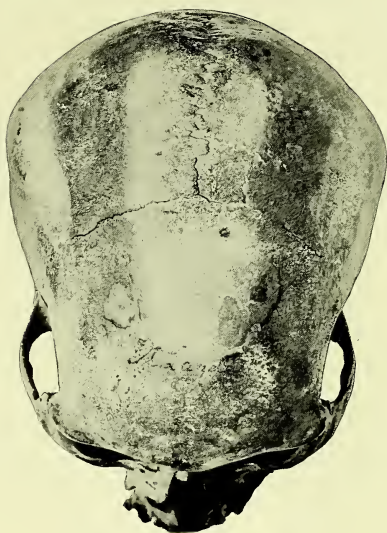


FIG. 2.—Tasmanian ♂.



FIG. 3.—Tasmanian ♂.

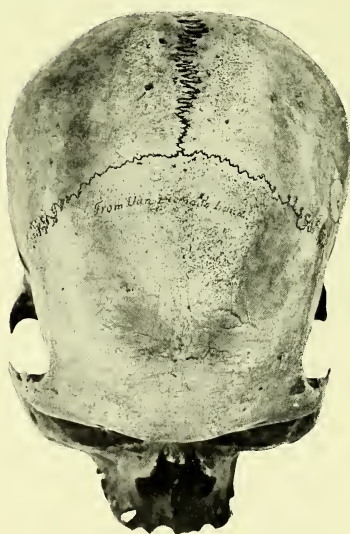


FIG. 4.—Tasmanian ♂.

SIR WILLIAM TURNER ON "Craniology of the Aborigines of Tasmania."—PLATE II.

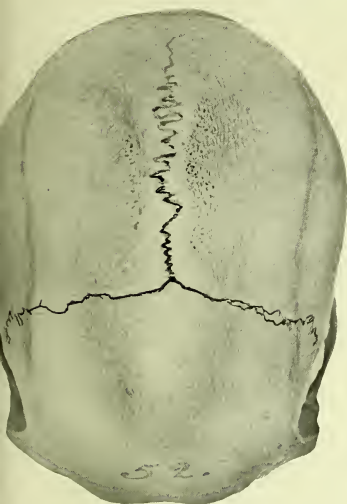


FIG. 5.—Tasmanian ♂.



FIG. 6.—Tasmanian ♂.

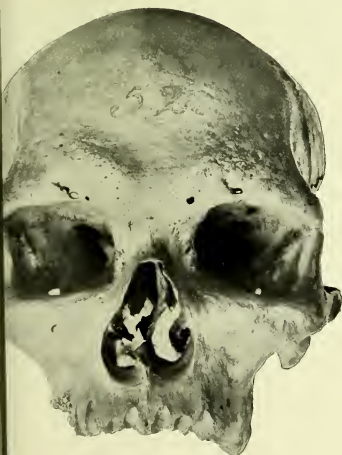


FIG. 7.—Tasmanian ♂.



FIG. 8.—Tasmanian ♂.

SIR WILLIAM TURNER on "Craniology of the Aborigines of Tasmania."—PLATE III.

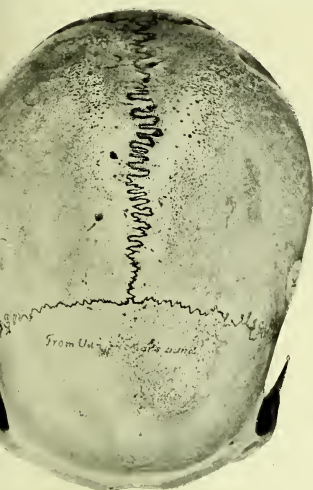


FIG. 9.—Tasmanian ♂.



FIG. 10.—Tasmanian ♂.

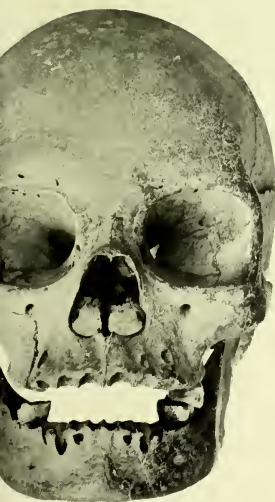


FIG. 11.—Tasmanian ♀.



FIG. 12.—Tasmanian ♀.

